

**EPA Superfund
Record of Decision:**

**MUNISPORT LANDFILL
EPA ID: FLD084535442
OU 01
NORTH MIAMI, FL
07/26/1990**

LANDFILL AREA - 170 ACRES; UPLAND AREA - 15 ACRES; HYDROLOGICALLY ALTERED WETLANDS WITHIN THE DIKE - 93 ACRES; AND AN AREA IMMEDIATELY ADJACENT TO BISCAYNE BAY (SOUTHEASTERN SECTION) - 13 ACRES (FIGURE 2).

THE NATURAL TOPOGRAPHY OF THE MUNISPORT PROPERTY HAS BEEN ALTERED AS A RESULT OF THE LANDFILL OPERATION. EIGHT BORROW PITS, COVERING A TOTAL AREA OF ABOUT 16 ACRES, HAVE BEEN EXCAVATED TO AN APPROXIMATE DEPTH OF 35 FEET TO PROVIDE COVER MATERIAL FOR THE REFUSE DEPOSITED ONSITE. THE BORROW PITS HAVE FILLED WITH WATER AND NOW APPEAR AS SMALL LAKES OR PONDS. THE REFUSE HAS BEEN BURIED OVER APPROXIMATELY 170 ACRES WITH AN AVERAGE DEPTH OF APPROXIMATELY 18 FEET AND A MAXIMUM DEPTH OF APPROXIMATELY 30 FEET. THIS CREATES A ROLLING TOPOGRAPHY THAT IS MORE PRONOUNCED IN THE NORTHERN PORTION OF THE PROPERTY THAN IN THE SOUTHERN PORTION.

THE ORIGINAL SOILS ON THE MUNISPORT PROPERTY CONSISTED OF ROCKDALE FINE SAND AND PERRINE MARL. SINCE LANDFILLING OPERATIONS BEGAN AT MUNISPORT, THE CHARACTER OF THE SOILS ON THE LANDFILL PORTION HAVE BEEN ALTERED SIGNIFICANTLY SO THAT THE ORIGINAL SOIL PROFILE NO LONGER EXISTS. THE EASTERN PORTION OF THE PROPERTY, WHICH HAS NOT BEEN USED AS A LANDFILL, IS STILL COVERED BY MANGROVE SWAMPS. A DIKE WAS CONSTRUCTED AT THE SOUTHEASTERN EDGE OF THE PROPERTY IN AN ATTEMPT TO PREVENT SURFACE WATER CONTAMINANT MIGRATION FROM THE LANDFILL TO THE MANGROVE PRESERVE. AS SHOWN IN FIGURE 2, THE MANGROVE SWAMPS OCCUPY TWO AREAS. ONE OF THESE AREAS IS BETWEEN THE DIKE AND LANDFILLED AREA AND IS REFERRED TO AS THE HYDROLOGICALLY ALTERED WETLANDS (ALTERED WETLANDS). THE SECOND AREA IS OUTSIDE OF THE DIKE AND IS TIDALLY CONNECTED WITH BISCAYNE BAY. THIS PORTION IS PART OF THE BISCAYNE BAY AQUATIC PRESERVE AND IS REFERRED TO AS THE MANGROVE PRESERVE.

THE HYDROLOGICALLY ALTERED WETLANDS ARE THE RESULT OF THE CONSTRUCTION OF A DIKE THROUGH THE MANGROVE SWAMP THAT ORIGINALLY BORDERED THE LANDFILL TO THE EAST. THE DIKE WAS CONSTRUCTED TO PREVENT CONTAMINATED RUNOFF FROM THE LANDFILL FROM ENTERING AND DAMAGING THE MANGROVE SWAMPS. HOWEVER, A LARGE SECTION (93 ACRES) OF THE MANGROVE SWAMP WAS CUT OFF TIDALLY FROM BISCAYNE BAY, HYDROLOGICALLY ALTERING THAT PORTION OF THE MANGROVE SWAMPS. THIS HAS RESULTED IN A RADICAL CHANGE IN HABITAT OF THIS PORTION OF THE MANGROVE SWAMPS. SINCE THERE IS NO TIDAL CONNECTION, WATER ENTERING THIS PORTION OF THE MANGROVE SWAMPS IS PRIMARILY FRESHWATER. AS A RESULT, THIS AREA HAS BEEN INVADDED BY NUMEROUS PLANT SPECIES SUCH AS THE AUSTRALIAN PINE AND BRAZILIAN PEPPER. SINCE THIS FRESHWATER HABITAT IS MORE CONDUCIVE TO THE GROWTH OF THESE EXOTIC SPECIES, THE NUMBER OF MANGROVE TREES WITHIN THE DIKED AREA HAS BEEN SEVERELY REDUCED. WITH REGARD TO THE AQUATIC LIFE IN THIS IMPOUNDED AREA, SPECIES OF PLANTS AND ANIMALS INDICATIVE OF A FRESHWATER HABITAT HAVE BECOME PREDOMINANT. BECAUSE THIS PORTION OF THE MANGROVE SWAMP HAS BEEN ISOLATED FROM TIDAL ACTIVITY, IT MERELY PROVIDES HABITAT FOR VARIOUS FRESHWATER ORGANISMS AND NO LONGER PLAYS A VITAL ROLE IN THE SUPPORT OF THE BISCAYNE BAY ECOSYSTEM.

UNDERLYING THE MUNISPORT PROPERTY IS THE BISCAYNE AQUIFER, A SHALLOW WATER TABLE AQUIFER THAT SERVES AS THE POTABLE WATER SOURCE FOR DADE COUNTY. HOWEVER, THE WATER QUALITY OF THE AREA UNDERLYING THE PROPERTY HAS BEEN DEGRADED BY SALTWATER INTRUSION (UNRELATED TO THE ACTIVITIES AT THE LANDFILL) AND THE WATER IS NOT USED AS A DRINKING WATER SOURCE. (THIS IS THE PRIMARY REASON FOR THE ABSENCE OF A HUMAN HEALTH THREAT FROM THE SITE.) THE DEEPER ARTESIAN FLORIDAN AQUIFER IS SALINE IN MOST OF SOUTHEASTERN FLORIDA AND IS THEREFORE UNSUITABLE AS A REGIONAL SOURCE OF DRINKING WATER. THE BISCAYNE AQUIFER EXTENDS VERTICALLY 150 FEET AT THE SITE. THE DIRECTION OF GROUNDWATER FLOW IN THE BISCAYNE AQUIFER AND SITE SURFACE DRAINAGE IS GENERALLY TO THE EAST-SOUTHEAST TOWARD BISCAYNE BAY.

ACCORDING TO THE US FISH AND WILDLIFE SERVICE ATLANTIC COAST ECOLOGICAL INVENTORY, THE AQUATIC LIFE OF BISCAYNE BAY INCLUDES 21 SPECIES OF FISH. ACCORDING TO OBSERVATIONS MADE BY THE FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION (FDNR) OVER A 10-YEAR PERIOD, THE NUMBER OF FISH SPECIES INHABITING BISCAYNE BAY MAY BE AS HIGH AS 45. THE ECOLOGICAL INVENTORY ALSO INDICATED THE PRESENCE OF NUMEROUS INVERTEBRATES, FOUR SPECIES OF SEA TURTLES, AND TWO SPECIES OF MARINE

MAMMALS. THE TWO MARINE MAMMALS IDENTIFIED INCLUDE BOTTLE-NOSE DOLPHIN AND THE WEST INDIAN MANATEE. THE MANATEE WAS REPORTED TO INHABIT NOT ONLY BISCAYNE BAY, BUT POSSIBLY ALL WATERWAYS ADJOINING BISCAYNE BAY. THE FOUR SPECIES OF SEA TURTLES AND THE MANATEE ARE PROTECTED BY THE ENDANGERED SPECIES ACT.

BISCAYNE BAY IS HEAVILY UTILIZED BY BOTH RECREATIONAL AND COMMERCIAL FISHERIES. THE MANGROVE SWAMPS AROUND THE BAY PROVIDE IMPORTANT BREEDING AND NURSERY GROUNDS FOR MARINE FISH AND INVERTEBRATES THAT CONTRIBUTE TO THE SUPPORT OF OFFSHORE FISHERIES. IN ADDITION TO SERVING AS AN IMPORTANT MARINE FISHERIES RESOURCE, THE MANGROVE SWAMPS ALSO PROVIDE PROTECTIVE HABITAT AND FEEDING AREAS FOR NUMEROUS BIRD SPECIES.

THE CLIMATE IN MIAMI CAN BE DESCRIBED AS SUBTROPICAL MARINE, CHARACTERIZED BY LONG, WARM SUMMERS WITH ABUNDANT RAINFALL AND A MILD, DRY WINTER. THE MEAN ANNUAL TEMPERATURE IS 75.5 DEGREES FAHRENHEIT. THE COLDEST MONTH IS JANUARY WITH AN AVERAGE OF 67.0 DEGREES FAHRENHEIT, AND THE WARMEST MONTH IS AUGUST WITH AN AVERAGE TEMPERATURE OF 82.7 DEGREE FAHRENHEIT. THE AVERAGE ANNUAL PRECIPITATION IS 46 INCHES.

#SHEA

SITE HISTORY AND ENFORCEMENT ACTIVITIES

IN 1959, INTERAMA, A DEVELOPMENT CORPORATION, PURCHASED A 1,700-ACRE TRACT OF LAND TO DEVELOP AS A TRADE AND CULTURAL CENTER. DURING THE MID-1960S, EARTH-MOVING ACTIVITIES TOOK PLACE, AND A DUMP WAS OPERATED ON A FEW ACRES OF LAND. ACCURATE RECORDS DO NOT EXIST AS TO THE TYPES OF WASTES LANDFILLED DURING THIS PERIOD. THE PRINCIPAL FILL MATERIAL WAS CLEAN FILL (E.G., LAWN TRIMMINGS, CONSTRUCTION DEBRIS, ETC.), BUT LATER MUNICIPAL REFUSE WAS USED. THE CITY OF NORTH MIAMI RECEIVED TITLE TO 350 ACRES OF THE PROPERTY IN 1970 IN EXCHANGE FOR FLOATING A \$12 MILLION BOND ISSUE TO ALLOW INTERAMA TO CONTINUE DEVELOPMENT. APPROXIMATELY ONE YEAR LATER, HOWEVER, INTERAMA WENT BANKRUPT AND THE CITY SUBSEQUENTLY LEASED 291 ACRES TO MUNISPORT, INC. FOR THE DEVELOPMENT OF A RECREATIONAL FACILITY.

MUNISPORT, INC. BEGAN OPERATIONS IN 1974 BY FILLING LOW-LYING AREAS WITH CLEAN FILL AND CONSTRUCTION DEBRIS. ALTHOUGH MUNISPORT, INC. WAS THE PRIMARY OPERATOR OF THE FACILITY, ANOTHER COMPANY, ABC DEMOLITION, PROVIDED THE HEAVY EQUIPMENT FOR THE LANDFILLING ACTIVITIES THROUGH A LEASE AGREEMENT WITH MUNISPORT, INC. LATER IN 1974, THE FLORIDA DEPARTMENT OF POLLUTION CONTROL (FDPC) FILED A "COMPLAINT FOR TEMPORARY INJUNCTION AND DAMAGES" AGAINST THE CITY OF NORTH MIAMI, MUNISPORT, INC., AND ABC DEMOLITION UNTIL A HEARING COULD BE HELD. IN 1975, THE CITY OF NORTH MIAMI AND MUNISPORT, INC. APPLIED FOR AND WERE GRANTED A TEMPORARY OPERATING PERMIT (TOP) FOR 15 MONTHS, ALLOWING THE USE OF SOLID WASTE (I.E., GARBAGE) FOR FILL ABOVE THE WATER TABLE.

THE US ARMY CORPS OF ENGINEERS (COE) ISSUED MUNISPORT, INC. A PERMIT IN 1976, PURSUANT TO SECTION 404 OF THE CLEAN WATER ACT (CWA), TO ALLOW THE FILLING OF "WATERS OF THE US" (WETLANDS) WITH CLEAN FILL AND CONSTRUCTION DEBRIS. LATER IN 1976, MUNISPORT, INC. RECEIVED A REVISED TOP FROM THE FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION (FDER), (FORMERLY FDPC), ALLOWING MORE TIME FOR THE EVALUATION OF A FULL OPERATING PERMIT.

DURING A 1976 INSPECTION OF THE FACILITY BY THE METROPOLITAN DADE COUNTY DEPARTMENT OF ENVIRONMENTAL RESOURCES MANAGEMENT (DERM), TWELVE 55-GALLON DRUMS (LABELED AS CONTAINING TRICRESYL PHOSPHATE, ETHYL CYANOACETATE, AND ACETONE) WERE OBSERVED LEAKING ONTO THE GROUND SURFACE IN THE EASTERN PORTION OF THE LANDFILL. A NOTICE OF VIOLATION (NOV) OF THE TOP WAS ISSUED TO MUNISPORT BY DERM FOR THE DISPOSAL OF HAZARDOUS WASTE AT A SANITARY LANDFILL. THE DRUMS WERE LATER REMOVED BY A CONTRACTOR FOR THE CITY OF NORTH MIAMI.

IN 1977, MUNISPORT, INC. APPLIED FOR A MODIFICATION OF THE 404 PERMIT TO ALLOW THE USE OF SOLID WASTE (GARBAGE) FOR FILL IN THE WETLANDS. EPA OPPOSED THE MODIFICATION AND, IN 1981, ISSUED A

CWA 404(C) VETO PROHIBITING THE FILLING OF THE WETLANDS WITH SOLID WASTE. SUBSEQUENTLY, THE EPA REGION IV ADMINISTRATOR ISSUED AN ADMINISTRATIVE ORDER THAT PROHIBITED ANY ADDITIONAL FILLING OF WETLANDS AND REQUIRED SOME WETLANDS RESTORATION. THE ORDER PROVIDED FOR THE REMOVAL AND/OR REALIGNMENT OF THE DIKING BETWEEN THE LANDFILL AND THE MANGROVE PRESERVE SUCH THAT THE HYDROLOGICALLY ALTERED WETLANDS COULD BE RESTORED. THIS ORDER HAS NOT BEEN COMPLIED WITH BY THE CITY OF NORTH MIAMI. IN 1981, FDER DIRECTED MUNISPORT, INC. AND THE CITY OF NORTH MIAMI TO PROVIDE FINAL CLOSURE OF THE LANDFILL. LANDFILL OPERATIONS CEASED IN 1981. HOWEVER, CLOSURE IN ACCORDANCE WITH STATE LAW HAS NOT TAKEN PLACE.

IN 1982, EPA EVALUATED THE MUNISPORT SITE AS A POTENTIAL CANDIDATE FOR THE NATIONAL PRIORITIES LIST (NPL). THE SITE WAS EVALUATED USING THE HAZARD RANKING SYSTEM (HRS; APPENDIX A OF 40 CFR 300), AND RECEIVED A SCORE OF 32.37. EPA PROPOSED THE SITE FOR INCLUSION TO THE NPL AND SOLICITED PUBLIC COMMENT ON THE PROPOSED LISTING IN THE DECEMBER 30, 1982 ISSUE OF THE FEDERAL REGISTER (47 FR 58484). THE ONLY COMMENT RECEIVED WAS FROM THE US DEPARTMENT OF INTERIOR (DOI) CONCERNING THE POTENTIAL PRESENCE OF MANATEES IN THE SITE AREA. DOI DID NOT OPPOSE THE LISTING, AND THE SITE WAS ADDED TO THE FINAL NPL IN THE SEPTEMBER 8, 1983 ISSUE OF THE FEDERAL REGISTER (48 FR 40673).

IN 1986, THE CITY OF NORTH MIAMI PETITIONED EPA FOR THE DELETION OF THE SITE FROM THE NPL. EPA REFUSED TO DELIST THE SITE AND NOTED ITS POLICY OF NOT RESCORING SITES THAT HAVE BEEN THROUGH THE RULEMAKING PROCESS AND LISTED ON THE NPL AS FINAL (49 FR 37080-81 (SEPT. 21, 1984)). CONSISTENT WITH THAT POLICY, EPA DECIDED TO CONDUCT AN RI OF THE SITE AND NOTED THAT THE SITE MAY BE DELETED IF IT DID NOT POSE A SIGNIFICANT THREAT TO PUBLIC HEALTH OR WELFARE, OR THE ENVIRONMENT, AS PROVIDED IN THE CODE OF FEDERAL REGULATIONS (40 CFR 300.66(C)(7)(III) (1985)). BASED ON RESULTS CONTAINED IN THE 1988 CAMP DRESSER AND MCKEE, INC. (CDM) RI/FS REPORT, EPA DETERMINED THAT THE MUNISPORT SITE PRESENTED NO SIGNIFICANT THREAT TO PUBLIC HEALTH; HOWEVER, THE THREAT TO THE ENVIRONMENT WAS INCONCLUSIVE.

BECAUSE OF A POTENTIAL THREAT TO THE ENVIRONMENT, EPA ISSUED A PROPOSED PLAN IN JULY 1988 THAT RECOMMENDED CLOSURE OF THE LANDFILL IN ACCORDANCE WITH FLORIDA'S LANDFILL CLOSURE LAW. ALL ALTERNATIVES, WITH THE EXCEPTION OF "NO ACTION," WERE CONSIDERED ACCEPTABLE. SUBSEQUENT TO THIS PUBLICATION, EPA REEVALUATED THE POTENTIAL ENVIRONMENTAL THREAT POSED BY THE SITE AND ISSUED A REVISED PROPOSED PLAN IN NOVEMBER 1988. THE REVISED PLAN STATED THAT AN ALTERNATIVE OF "NO ACTION" UNDER CERCLA WAS APPROPRIATE GIVEN THE LIMITED ENVIRONMENTAL THREAT. THE PUBLIC WAS NOTIFIED OF EPA'S RECOMMENDED CHANGE TO THE PROPOSED PLAN AND SOLICITATION OF COMMENT THROUGH A PUBLIC NOTICE PUBLISHED IN LOCAL NEWSPAPERS. THE PROPOSAL OF "NO ACTION" UNDER CERCLA WAS OPPOSED BY LOCAL CITIZENS, SEVERAL ENVIRONMENTAL GROUPS, THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA), AND THE US FISH AND WILDLIFE SERVICE. ESSENTIALLY, MEMBERS OF THE PUBLIC AND SEVERAL GOVERNMENT AGENCIES FELT THAT THE RESULTS FROM STUDIES WERE NOT SUFFICIENT TO ASSESS POTENTIAL IMPACTS TO AQUATIC LIFE IN THE MANGROVE PRESERVE.

IN RESPONSE TO THE PUBLIC'S CONCERN, THE EPA ENVIRONMENTAL SERVICES DIVISION (ESD) CONDUCTED A SUBSEQUENT STUDY IN JUNE 1989 THAT FOCUSED ON THE POTENTIAL THREAT TO THE ADJACENT STATE MANGROVE PRESERVE. RESULTS OF THIS STUDY CONCLUSIVELY DEMONSTRATED THAT LEACHATE FROM THE LANDFILL POSES A SIGNIFICANT THREAT TO THE AQUATIC ORGANISMS IN THE MANGROVE PRESERVE. THUS, PURSUANT TO THE AUTHORITY GRANTED IN SECTION 104 OF CERCLA, EPA DETERMINED THAT REMEDIAL ACTION IS APPROPRIATE IN ORDER TO PROTECT THE ENVIRONMENT.

#HCP

HIGHLIGHTS OF COMMUNITY PARTICIPATION

IN RECENT YEARS, THE PUBLIC HAS BEEN PROVIDED THE OPPORTUNITY TO COMMENT ON THE RESULTS OF SEVERAL STUDIES AND PROPOSED REMEDIAL ACTIONS. THE FIRST OF THESE INCLUDE THE EPA 1988 RI/FS REPORTS AND THE EPA 1988 PROPOSED PLAN FOR REMEDIAL ACTION. THE PROPOSED PLAN EXPLAINED THAT

ALL OF THE ALTERNATIVES, WITH THE EXCEPTION OF "NO ACTION," WERE APPROPRIATE TO MITIGATE THE THREAT TO THE ENVIRONMENT. THESE DOCUMENTS WERE MADE AVAILABLE TO THE PUBLIC IN BOTH THE ADMINISTRATIVE RECORD (AR) FILE AND AN INFORMATION REPOSITORY MAINTAINED AT 1) THE EPA, REGION IV DOCKET ROOM AND 2) THE NORTH MIAMI PUBLIC LIBRARY. THE NOTICE OF AVAILABILITY OF THESE DOCUMENTS WAS PUBLISHED IN THE MIAMI HERALD ON JULY 24, 1988. A PUBLIC COMMENT PERIOD WAS HELD FROM JULY 20 THROUGH AUGUST 17, 1988 FOR A TOTAL OF 28 DAYS WHICH WAS CONSISTENT WITH THE 1988 NCP REQUIREMENTS. IN ADDITION, A PUBLIC MEETING WAS HELD ON JULY 27, 1988 AT THE HIGHLAND VILLAGE COMMUNITY CENTER IN NORTH MIAMI. AT THIS MEETING, REPRESENTATIVES OF EPA, FDER, AND DERM WERE AVAILABLE TO ANSWER QUESTIONS ABOUT THE PROBLEMS AT THE SITE AND THE PROPOSED REMEDIAL ACTION.

AFTER THE COMMENT PERIOD AND PUBLIC MEETING ON THE RI/FS AND PROPOSED PLAN, A NOTICE WAS ISSUED TO THE PUBLIC ANNOUNCING A CHANGE TO THE PLAN. THIS NOTICE WAS BASED ON FURTHER EVALUATION OF THE DATA BY EPA THAT INDICATED THE THREAT TO THE ENVIRONMENT DID NOT APPEAR SIGNIFICANT. THIS NOTICE WAS PUBLISHED IN THE MIAMI HERALD ON NOVEMBER 27, 1988 AND EXPLAINED THAT NO REMEDIAL ACTION "UNDER CERCLA" WAS APPROPRIATE AT THIS TIME SINCE THE SITE, AS DEMONSTRATED BY THE 1988 RI/FS, DID NOT CONSTITUTE A THREAT TO PUBLIC HEALTH OR WELFARE, OR THE ENVIRONMENT. PROPER CLOSURE OF THE LANDFILL BY THE STATE UNDER STATE LAW WAS STILL RECOMMENDED.

EPA RECEIVED SUBSTANTIAL COMMENT FROM THE PUBLIC AND OTHER REGULATORY AGENCIES EXPRESSING CONCERN THAT THE LEACHATE FROM THE LANDFILL DOES POSE A THREAT TO THE MANGROVE PRESERVE. AN ADDITIONAL STUDY OF THE SITE WAS THEREFORE CONDUCTED BY EPA IN JUNE 1989 TO FURTHER DEFINE THE ENVIRONMENTAL THREAT. THE SUBSEQUENT REPORT, MUNISPORT FS ADDENDUM (1990, CH2M HILL), AND EPA PROPOSED PLAN FOR REMEDIAL ACTION WERE MADE AVAILABLE TO THE PUBLIC IN BOTH THE AR FILE AND INFORMATION REPOSITORY MAINTAINED AT THE EPA REGION IV DOCKET ROOM AND THE NORTH MIAMI PUBLIC LIBRARY. THE NOTICE OF AVAILABILITY OF THESE DOCUMENTS WAS PUBLISHED IN THE MIAMI HERALD ON MARCH 16 AND 25, 1990. PUBLIC NOTICE WAS ALSO GIVEN IN THE NEW TIMES, A LOCAL PAPER, ON MARCH 21, 1990. A PUBLIC COMMENT PERIOD WAS HELD FROM MARCH 16 THROUGH APRIL 14, 1990 FOR A TOTAL OF 30 DAYS WHICH WAS CONSISTENT WITH THE 1990 NCP REQUIREMENTS. IN ADDITION, A PUBLIC MEETING WAS HELD AT FLORIDA INTERNATIONAL UNIVERSITY IN NORTH MIAMI ON MARCH 29, 1990. REPRESENTATIVES OF EPA, FDER, NOAA, AND DERM WERE AVAILABLE AT THIS MEETING TO ANSWER QUESTIONS ABOUT THE PROBLEMS AT THE SITE AND THE PROPOSED REMEDIAL ACTION.

A RESPONSE TO THE COMMENTS RECEIVED ON THE RI/FS, FS ADDENDUM, AND MOST RECENT PROPOSED PLAN IS INCLUDED IN A RESPONSIVENESS SUMMARY, WHICH IS INCLUDED IN THIS RECORD OF DECISION (ROD) IN APPENDIX B. THIS ROD PRESENTS THE CERCLA REMEDIAL ACTION FOR THE MUNISPORT NPL SITE IN NORTH MIAMI, FLORIDA. THIS ACTION HAS BEEN CHOSEN IN ACCORDANCE WITH CERCLA, AS AMENDED BY SARA AND, TO THE MAXIMUM EXTENT PRACTICABLE, THE NATIONAL CONTINGENCY PLAN. THE DECISION FOR THIS SITE IS BASED ON THE AR.

#SRRA

SCOPE AND ROLE OF RESPONSE ACTION

RESULTS OF THE EPA MANGROVE STUDY DEMONSTRATED THAT LEACHATE-CONTAMINATED GROUNDWATER IS MIGRATING FROM THE MUNISPORT LANDFILL TO THE SOUTHEAST AND EMERGING IN THE STATE MANGROVE PRESERVE. THE STUDY FURTHER DEMONSTRATED THAT THE LEACHATE IS BOTH ACUTELY AND CHRONICALLY TOXIC TO AQUATIC LIFE.

IN RESPONSE TO THIS THREAT, THE AGENCY HAS DETERMINED THAT A RESPONSE ACTION DESIGNED TO ABATE THE THREAT TO THE ENVIRONMENT IS NECESSARY AND PRUDENT. THE RESPONSE ACTION WILL BE DESIGNED TO PROTECT AQUATIC LIFE IN THE MANGROVE PRESERVE BY INTERCEPTING, COLLECTING, AND TREATING THE LEACHATE-CONTAMINATED GROUNDWATER PRIOR TO ITS EMERGENCE IN THE MANGROVE PRESERVE. TOXIC LEACHATE WILL THUS BE PREVENTED, TO THE EXTENT NECESSARY, FROM MIGRATING INTO THE PRESERVE AND ADVERSELY IMPACTING AQUATIC LIFE.

THE REMEDY WILL ALSO IMPROVE THE CIRCULATION OF TIDAL WATER IN THE PRESERVE AND THE HYDROLOGICALLY ALTERED WETLANDS BY MODIFYING THE CULVERT STRUCTURES WHICH PRESENTLY RESTRICT EXCHANGE WITH WATER IN THE BAY. BY PROMOTING TIDAL MIXING, ADDITIONAL MITIGATION WILL BE PROVIDED. MOREOVER, THIS IMPROVED TIDAL CONNECTION WILL ALLOW THE ALTERED WETLANDS TO RESUME THEIR FUNCTION AS AN INTEGRAL PART OF BISCAYNE BAY AND THE ENVIRONMENT.

THE LANDFILL WILL BE CLOSED AT THE DIRECTION OF FDER, PURSUANT TO FLORIDA'S LANDFILL CLOSURE LAW, FLORIDA ADMINISTRATIVE CODE (FAC), CHAPTER 17-701. THE STATE IS IN RECEIPT OF PRELIMINARY LANDFILL CLOSURE DOCUMENTS FROM THE POTENTIALLY RESPONSIBLE PARTY (PRP). THIS IS AN APPROPRIATE STEP, CONSISTENT WITH THE PLANNED CERCLA ACTION. LANDFILL CLOSURE UNDER EPA'S DIRECTION IS UNNECESSARY AND WOULD SIMPLY DUPLICATE THE STATE'S EFFORT. HOWEVER, EPA WILL CONSULT WITH THE STATE AND LOCAL OFFICIALS DURING THE CLOSURE PROCESS TO ENSURE THAT THE FEDERAL AND STATE ACTIONS ARE CONSISTENT WITH THE CERCLA REMEDY AND TIMELY. IN THE EVENT THAT ADDITIONAL DATA COLLECTED PRIOR TO OR DURING THE REMEDIAL DESIGN INDICATES THAT A LARGER PORTION OF THE LANDFILL IS NEEDED TO IMPLEMENT THE CERCLA RESPONSE ACTION, EPA WILL RETAIN JURISDICTION OVER THIS LARGER PORTION OF THE LANDFILL (54 FR 41002-3 (OCTOBER 4, 1989)). FINALLY, IF PROPER CLOSURE UNDER STATE LAW IS NOT ACCOMPLISHED BY EPA'S FIRST 5-YEAR REVIEW OF THE SITE, EPA WILL CONSIDER WHETHER FURTHER ACTION IS WARRANTED UNDER CERCLA.

#SC

SITE CHARACTERISTICS

THE LAND ON WHICH THE MUNISPORT LANDFILL IS LOCATED WAS ORIGINALLY PLANNED AS A RECREATIONAL COMPLEX FOR LOCAL RESIDENTS. SINCE MUCH OF THE LAND CONSISTED OF LOW-LYING AREAS WITH ELEVATIONS NEAR SEA LEVEL, IT WAS NECESSARY TO FILL MANY SUCH AREAS TO MAKE DEVELOPMENT POSSIBLE. ALTHOUGH THE USE OF CLEAN FILL SUCH AS CONSTRUCTION DEBRIS WAS ORIGINALLY PLANNED FOR THESE AREAS, THE USE OF SOLID WASTE (GARBAGE) FOR FILL BEGAN IN LATE 1974 AND CONTINUED INTO 1981. THIS RESULTED IN THE DISPOSAL OF AN ESTIMATED 5 MILLION CUBIC YARDS OF WASTE AND SOIL COVER.

A REVIEW OF DISPOSAL RECORDS INDICATES THAT THE PROPERTY WAS ESSENTIALLY OPERATED AS A SOLID WASTE LANDFILL. THIS DETERMINATION IS FURTHER SUPPORTED BY DATA COLLECTED FROM THE NUMEROUS SAMPLING INVESTIGATIONS, INCLUDING ANALYSES OF SOIL, GROUNDWATER, SEDIMENT, AND SURFACE WATER SAMPLES WHICH SHOW NO EVIDENCE OF SIGNIFICANT CONTAMINATION.

ALTHOUGH NUMEROUS ORGANIC COMPOUNDS AND INORGANIC CONSTITUENTS HAVE BEEN DETECTED AMONG THE SAMPLES, THE DATA SET, WHEN REVIEWED AS A WHOLE, INDICATES THAT THE SUBSTANCES DETECTED ARE INDICATIVE OF MATERIALS ASSOCIATED WITH COMMON HOUSEHOLD WASTES. THE SUBSTANCES DETECTED AND THEIR RESPECTIVE CONCENTRATIONS ARE NOT INDICATIVE OF A HAZARDOUS WASTE SITE. FURTHER, AS NOTED IN SECTION 2.3 ABOVE, THE GROUNDWATER BENEATH SITE IS NOT SUITABLE FOR DRINKING (FOR REASONS UNRELATED TO THE LANDFILL OPERATIONS). BASED ON THE RESULTS OF THE RI, EPA DETERMINED THAT THE SUBSTANCES DETECTED IN THE SOIL, GROUNDWATER, SEDIMENT, AND SURFACE WATER SAMPLES COLLECTED ON AND AROUND THE LANDFILL PROPER DO NOT PRESENT A THREAT TO PUBLIC HEALTH OR WELFARE.

HOWEVER, STUDY OF THE IMPACTS OF THE LANDFILL LEACHATE ON THE MANGROVE PRESERVE HAS SHOWN THAT THE RELEASE OF THIS LEACHATE INTO THE GROUNDWATER AND ITS SUBSEQUENT EMERGENCE IN THE MANGROVE PRESERVE REPRESENTS A SIGNIFICANT THREAT TO THE ENVIRONMENT. THIS THREAT RESULTS FROM THE RELEASE OF HAZARDOUS SUBSTANCES FROM THE LANDFILL IN LEACHATE COMBINED WITH THE IMPROPER PLACEMENT OF THE LANDFILL IN A VERY COMPLEX HYDROLOGIC SETTING AND SENSITIVE ECOLOGIC SYSTEM. THE FOLLOWING SECTIONS DESCRIBE THE HYDROLOGIC AND ECOLOGIC SYSTEMS IN WHICH THE SITE IS LOCATED. THE FOLLOWING SECTIONS ALSO PROVIDE AN OVERVIEW OF THE RESULTS OF STUDIES THAT HAVE BEEN CONDUCTED AT THIS SITE.

HYDROLOGIC SETTING

THE MUNISPORT LANDFILL LIES AT THE SOUTHERN TIP OF THE FLORIDA PENINSULA, THE PORTION OF THE FLORIDAN PLATEAU WHICH IS EXPOSED ABOVE SEA LEVEL. THE PROPERTY IS LOCATED ON THE EDGE OF THE ATLANTIC COASTAL RIDGE AS IT DECLINES IN ELEVATION TOWARD BISCAYNE BAY. THE RIDGE EXTENDS SEVERAL MILES INLAND AND HAS AN AVERAGE ELEVATION BETWEEN 8 AND 10 FEET ABOVE MEAN SEA LEVEL (MSL). THE ELEVATIONS AT THE MUNISPORT PROPERTY RANGE FROM 30 FEET ABOVE MSL TO ELEVATIONS NEAR SEA LEVEL. THE MAXIMUM ELEVATIONS EXCEED THOSE FOUND ON ADJACENT PROPERTIES DUE TO THE LANDFILL ACTIVITIES THAT OCCURRED ON THE MUNISPORT PROPERTY. EXCAVATIONS WERE ALSO MADE ON THE PROPERTY TO PROVIDE A SOURCE OF SOIL COVER DURING LANDFILLING ACTIVITIES. SOME OF THE BORROW PITS WERE EXCAVATED TO DEPTHS AS GREAT AS 30 FEET BELOW LAND SURFACE.

THE MUNISPORT PROPERTY IS UNDERLAIN BY THE BISCAYNE AQUIFER. THIS AQUIFER IS A SHALLOW WATER TABLE AQUIFER AND SERVES AS THE SOLE SOURCE OF POTABLE WATER FOR DADE COUNTY. WITHIN THE VICINITY OF THE MUNISPORT PROPERTY, HOWEVER, THE AQUIFER HAS BEEN IMPACTED BY SALTWATER INTRUSION AND NO LONGER SERVES AS A SOURCE OF POTABLE WATER. THE AQUIFER EXTENDS VERTICALLY FROM NEAR SURFACE TO APPROXIMATELY 150 FEET DEEP IN THE AREA OF THE MUNISPORT PROPERTY AND IS TYPICALLY CONTAINED WITHIN THE PERMEABLE PORTIONS OF SEVERAL SAND AND LIMESTONE FORMATIONS. THE STRATIGRAPHIC FORMATIONS WHICH COMPRISE THE BISCAYNE AQUIFER INCLUDE, IN DESCENDING ORDER, THE PAMLICO SAND, MIAMI LIMESTONE, ANASTASIA, AND TAMIAMI. THE LOWER PORTION OF THE TAMIAMI SERVES AS THE LOWER CONFINING UNIT SEPARATING THE BISCAYNE AQUIFER FROM THE FLORIDAN AQUIFER.

GROUNDWATER FLOW IN THE BISCAYNE AQUIFER IN THE VICINITY OF THE MUNISPORT PROPERTY IS TYPICALLY TOWARD THE EAST AND SOUTHEAST. THE DIRECTION OF FLOW IS HIGHLY INFLUENCED ON A LOCAL BASIS BY DRAINAGE CANALS, LAKES, RIVERS, AND BISCAYNE BAY. SURFACE WATER FEATURES IN PROXIMITY, IN ADDITION TO BISCAYNE BAY, THAT MAY AFFECT THE LOCAL GROUNDWATER FLOW INCLUDE THE SOUTHERN CANAL AND THE OLETA RIVER. TIDAL DYNAMICS ASSOCIATED WITH BISCAYNE BAY FURTHER INFLUENCE THE DIRECTION AND RATE OF GROUNDWATER FLOW IN THE BISCAYNE AQUIFER. A FINAL INFLUENCE ON THE HYDROGEOLOGY IS THE PHYSICOCHEMICAL EFFECTS RESULTING FROM THE MIXING OF SALINE WATER FROM THE BAY WITH THE RELATIVELY FRESH WATER IN THE AQUIFER.

ENVIRONMENTAL SETTING

THE MUNISPORT PROPERTY IS LOCATED IN A COASTAL AREA ADJOINING BISCAYNE BAY. OTHER ADJOINING SURFACE WATERS INCLUDE THE OLETA RIVER TO THE NORTH AND THE SOUTHERN CANAL TO THE SOUTH. IN ADDITION TO THESE SURFACE WATER BODIES, EXTENSIVE WETLAND AREAS ARE PRESENT THAT ARE TYPICALLY COMPOSED OF STANDS OF SEVERAL SPECIES OF MANGROVES. THESE MANGROVE STANDS REPRESENT ECOLOGICAL COMMUNITIES THAT PLAY A VITAL ROLE IN THE ENVIRONMENT. AS WITH MOST ENVIRONMENTS, THESE COMMUNITIES ARE VERY SENSITIVE TO CONTAMINATION AND THEIR ECOLOGICAL FUNCTION IS OFTEN SEVERELY IMPAIRED IF CONTAMINATED.

THE MAJORITY OF THE MUNISPORT PROPERTY IS SITUATED ON TOP OF FORMER WETLANDS AND THE EASTERN BORDER OF THE LANDFILL CURRENTLY ADJOINS WETLAND AREAS, PART OF WHICH IS A STATE MANGROVE PRESERVE. THIS MANGROVE PRESERVE IS ALSO PART OF THE BISCAYNE BAY AQUATIC PRESERVE. BOTH PRESERVES WERE ESTABLISHED BY THE FLORIDA STATE LEGISLATURE WITH THE INTENT THAT THEY BE PRESERVED IN AN ESSENTIALLY NATURAL CONDITION SO THAT THEIR BIOLOGICAL AND AESTHETIC VALUE MAY BE ENJOYED BY FUTURE GENERATIONS.

IN ADDITION TO THE AESTHETIC VALUE OF THESE PRESERVES AND THE OTHER ADJOINING WETLAND AREAS, THESE WETLANDS PLAY MANY OTHER IMPORTANT ROLES IN THE ENVIRONMENT. ONE PARAMOUNT FUNCTION OF THE WETLANDS IS THEIR SUPPORT OF THE AQUATIC FOOD CHAIN. THESE WETLAND AREAS PROVIDE A SOURCE OF DETRITUS, WHICH IS A FOOD SOURCE FOR MANY OF THE SMALLER AQUATIC ORGANISMS SUCH AS INVERTEBRATES, VARIOUS SHELLFISH, AND FORAGE FISH. THESE ORGANISMS IN TURN PROVIDE A SOURCE OF FOOD FOR MANY OF THE LARGER PREDATORY FISH CAUGHT RECREATIONALLY AND COMMERCIALY IN BISCAYNE BAY AND THE ATLANTIC OCEAN. IN ADDITION, THESE WETLANDS SERVE AS BREEDING AND PRINCIPAL NURSERY AREAS FOR MANY OF THE FISH SPECIES FOUND IN THE BAY AND OCEAN. OTHER IMPORTANT FUNCTIONS OF

THESE WETLANDS INCLUDE FISH, BIRDS, AND OTHER WILDLIFE HABITAT, WATER QUALITY IMPROVEMENT, FLOOD PROTECTION, AND SHORELINE EROSION CONTROL.

FINALLY, IN ADDITION TO THE WETLAND AREAS ADJACENT TO THE MUNISPORT PROPERTY, BISCAYNE BAY, ALONG WITH SEVERAL OTHER ADJOINING WATER BODIES, SERVES AS A HABITAT FOR FOUR SPECIES OF SEA TURTLES AND THE MANATEE, WHICH ARE PROTECTED BY THE ENDANGERED SPECIES ACT.

THE RAPID DECLINE OF MANY OF THESE WETLAND AREAS AS A RESULT OF THE URBANIZATION OF THE MIAMI AREA MAKES THEIR PROTECTION IMPERATIVE. THE MANGROVE PRESERVE ADJACENT TO THE MUNISPORT LANDFILL IS ONE OF THE LAST NATIVE STANDS OF MANGROVES IN THE MIAMI AREA. MEASURES MUST BE TAKEN AT THE MUNISPORT SITE TO PREVENT THE FURTHER DEMISE OF ADDITIONAL AREAS WITHIN THIS IMPORTANT NATURAL RESOURCE.

SUMMARY OF INVESTIGATIONS

SINCE 1975 NUMEROUS INVESTIGATIONS HAVE BEEN CONDUCTED AT THE MUNISPORT LANDFILL AREA TO DETERMINE THE POTENTIAL THREAT TO THE PUBLIC AND ENVIRONMENT. TO DATE, FIVE MAJOR STUDIES HAVE BEEN CONDUCTED BY VARIOUS LOCAL GOVERNMENTS AND STATE AND FEDERAL AGENCIES. THE SCOPE OF EACH OF THESE STUDIES IS BRIEFLY OUTLINED IN THE FOLLOWING:

I. FDER/DERM GROUNDWATER, SURFACE WATER, AND LEACHATE MONITORING (1975-1983)

- MONITORING OF 14 GROUNDWATER WELLS LOCATED ON AND AROUND THE LANDFILL SITE,
- MONITORING OF SURFACE WATERS IN EIGHT ONSITE LAKES (FORMER BORROW PITS), WETLAND AREA, A DITCH LEADING TO BISCAYNE BAY, AND THE MANGROVE PRESERVE,
- MONITORING OF LEACHATE EMERGING IN THE NORTHWEST LAKE (FORMER BORROW PIT).

II. EPA SITE INVESTIGATION (1984)

- COLLECTION OF GROUNDWATER SAMPLES FROM SEVEN EXISTING MONITORING WELLS LOCATED ON AND OFFSITE AND ONE TEMPORARY WELL LOCATED ONSITE,
- COLLECTION OF 12 SURFACE WATER SAMPLES FROM ONSITE LAKES AND THE MANGROVE PRESERVE,
- COLLECTION OF 13 SEDIMENT SAMPLES FROM ONSITE LAKES (FORMER BORROW PITS) AND THE MANGROVE PRESERVE,
- COLLECTION OF TWO SOIL SAMPLES FROM LOCATIONS ON THE LANDFILL PROPER.

III. H. R. ROSS ASSOCIATES LANDFILL CLOSURE STUDY (1986) (PRP/STATE SPONSORED)

- INSTALLATION OF FIVE WELLS AND COLLECTION OF GROUNDWATER SAMPLES FROM EACH,
- COLLECTION OF 15 SURFACE WATER SAMPLES FROM FIVE OF THE MOST CONTAMINATED LAKES (NORTHWEST, NORTH, EAST, EAST CENTRAL, AND SOUTHEAST) (FORMER BORROW PITS),
- ANALYSIS OF GROUNDWATER AND SURFACE WATER SAMPLES FOR AMMONIA AS AN INDICATOR OF CONTAMINATION.

IV. EPA RI/FS (1988)

- INSTALLATION AND COLLECTION OF GROUNDWATER SAMPLES FROM 29 WELLS LOCATED ON AND

AROUND THE LANDFILL,

- COLLECTION OF 29 SURFACE WATER AND 8 SEDIMENT SAMPLES FROM LOCATIONS AMONG ONSITE LAKES, WETLAND AREAS INCLUDING THE MANGROVE PRESERVE, BISCAYNE BAY, OLETA RIVER, SOUTHERN CANAL, AND A LAGOON EAST OF THE SITE,
- COLLECTION OF 25 SOIL SAMPLES FROM LOCATIONS ON THE LANDFILL, UNFILLED AREAS ALONG THE DIKE AND THE EDGE OF THE LANDFILL, AND BACKGROUND AREAS,
- PERFORMANCE OF 15 SEPARATE BIOACCUMULATION TESTS AMONG SIX DIFFERENT SPECIES OF AQUATIC VERTEBRATES AND INVERTEBRATES COLLECTED FROM ONSITE AND BACKGROUND LOCATIONS,
- BIOASSAYS ON AQUATIC ORGANISMS USING 11 SURFACE WATER SAMPLES COLLECTED FROM SEVERAL ONSITE LAKES (FORMER BORROW PITS), TIDAL AND IMPOUNDED MANGROVE AREAS, AND THE OLETA RIVER,
- BIOASSAYS ON AQUATIC ORGANISMS USING GROUNDWATER SAMPLES COLLECTED FROM FOUR MONITORING WELLS, THREE OF WHICH WERE LOCATED ON THE LANDFILL AND ONE LOCATED UPGRADIENT OF THE LANDFILL,

V. EPA WATER QUALITY AND TOXIC ASSESSMENT STUDY, MANGROVE PRESERVE (1989)

- EVALUATION OF THE EMERGENCE OF LEACHATE IN SURFACE WATER IN THE MANGROVE PRESERVE THROUGH MONITORING OF TIDAL CYCLES AND AMMONIA CONCENTRATIONS AT NUMEROUS LOCATIONS IN THE MANGROVE PRESERVE AND VICINITY,
- ASSESSMENT OF POTENTIAL TOXIC EFFECTS OF EMERGING LEACHATE ON AQUATIC LIFE IN THE MANGROVE PRESERVE THROUGH BIOASSAYS ON FOUR DIFFERENT KINDS OF AQUATIC ORGANISMS USING SURFACE WATERS COLLECTED FROM 11 STATIONS LOCATED IN THE MANGROVE PRESERVE AND VICINITY,
- EVALUATION OF POTENTIAL NUTRIENT ENRICHMENT EFFECTS OF SURFACE WATER DISCHARGED FROM THE MANGROVE PRESERVE INTO BISCAYNE BAY THROUGH BIOASSAYS ON A UNICELLULAR ALGAL SPECIES USING SURFACE WATERS COLLECTED FROM FOUR STATIONS LOCATED IN THE MANGROVE PRESERVE AND VICINITY.

A BRIEF SUMMARY OF THE RESULTS FROM THESE STUDIES IS PROVIDED BELOW. DETAILED ACCOUNTS OF THE RESULTS OF THE STUDIES CAN BE FOUND IN THE ACTUAL REPORTS WHICH ARE MAINTAINED IN THE AR FILE AND INFORMATION REPOSITORY FOR THIS SITE.

I. FDER/DERM GROUNDWATER, SURFACE WATER, AND LEACHATE MONITORING (1975-1983)

- LOW LEVELS OF VARIOUS METALS WERE DETECTED AMONG THE GROUNDWATER SAMPLES COLLECTED FROM THE SITE. THE HIGHEST CONCENTRATION OF A METAL DETECTED WAS FOR LEAD AT A CONCENTRATION OF 0.90 MG/L. GROUNDWATER SAMPLES WERE NOT ANALYZED FOR THE PRESENCE OF ORGANIC COMPOUNDS.
- SURFACE WATER SAMPLES COLLECTED FROM AREAS ON AND ADJACENT TO THE LANDFILL INDICATED THE PRESENCE OF AMMONIA-NITROGEN (NH₃-N), NITRATES, AND/OR NITRITES. IN JANUARY 1975, NINE OF THE TWELVE SURFACE WATER SAMPLES CONTAINED LEVELS OF NITRITE/NITRATE RANGING FROM 0.02 TO 1.86 PARTS PER MILLION (PPM). RESULTS FROM AUGUST 1979 SAMPLING (BY DERM) OF SURFACE WATER ALONG THE WESTERN EDGE OF THE MANGROVE PRESERVE INDICATED THE PRESENCE OF AMMONIA-NITROGEN RANGING IN CONCENTRATION FROM 6.6 TO 9.6

PPM. WATERS ALONG THE WESTERN EDGE OF THE PRESERVE WERE RESAMPLED IN JANUARY 1980 AND INDICATED THE PRESENCE OF NH₃-N AT CONCENTRATIONS RANGING FROM 3.1 TO 4.1 PPM.

- RESULTS FROM ANALYSIS OF THREE LEACHATE SAMPLES COLLECTED BY DERM FROM AN AREA NEAR THE NORTHWEST LAKE INDICATED THE PRESENCE OF NH₃-N IN TWO OF THE THREE SAMPLES AT CONCENTRATIONS GREATER THAN 510 PPM.

II. EPA SITE INVESTIGATION (1984)

- RESULTS FROM ANALYSIS OF A SELECT NUMBER OF WELLS INDICATED THE PRESENCE OF METALS CHARACTERISTIC OF A CARBONATE AQUIFER. RESULTS FROM ORGANIC ANALYSIS OF SAMPLES COLLECTED ONSITE INDICATED THE PRESENCE OF NUMEROUS ORGANIC COMPOUNDS. CONCENTRATIONS, HOWEVER, WERE TYPICALLY LOW, OFTEN AT OR BELOW DETECTION LIMITS. THE ONE EXCEPTION WAS THE DETECTION OF CHLOROETHANE, WHICH WAS DETECTED AT A CONCENTRATION OF 130 UG/L IN A GROUNDWATER SAMPLE COLLECTED IN THE NORTHWESTERN SECTION OF THE LANDFILL. THE HIGHEST CONCENTRATIONS OF AMMONIA AND TOTAL KJELDAHL NITROGEN WERE REPORTED IN A SAMPLE COLLECTED FROM A LOCATION DOWNGRADIENT OF THE EAST CENTRAL SIDE OF THE LANDFILL WITH CONCENTRATIONS AT 160 MG/L AND 145 MG/L, RESPECTIVELY.
- RESULTS FROM ANALYSIS OF SURFACE WATER SAMPLES COLLECTED FROM ONSITE LAKES (FORMER BORROW PITS) INDICATED THE PRESENCE OF METALS THAT ARE CHARACTERISTIC OF A CARBONATE ROCK ENVIRONMENT. RESULTS FROM ORGANIC ANALYSIS INDICATED THE PRESENCE OF NUMEROUS ORGANIC COMPOUNDS WITH LOW CONCENTRATIONS, RANGING FROM 5.3 TO 13 UG/L. CONCENTRATIONS OF AMMONIA AND TOTAL KJELDAHL NITROGEN WERE RELATIVELY LOW.
- RESULTS FROM ANALYSIS OF SEDIMENT SAMPLES INDICATED THE PRESENCE OF METALS THAT ARE CHARACTERISTIC OF CARBONATE ROCK ENVIRONMENTS WITH THE EXCEPTION OF ARSENIC. ARSENIC WAS DETECTED IN A SAMPLE COLLECTED FROM THE MANGROVE PRESERVE NEAR THE WEST CULVERT AT A CONCENTRATION OF 26 MG/KG. RESULTS FROM ORGANIC ANALYSIS OF SEDIMENT SAMPLES TYPICALLY INDICATED THE PRESENCE OF A RELATIVELY SMALL NUMBER OF COMPOUNDS AT LOW CONCENTRATIONS, WITH THE EXCEPTION OF SAMPLES COLLECTED FROM TWO FORMER BORROW PITS (NORTH LAKE AND EAST LAKE). NUMEROUS ORGANIC COMPOUNDS WERE DETECTED IN THESE TWO SAMPLES, WITH THE HIGHEST NUMBER AND CONCENTRATIONS DETECTED IN THE SAMPLE COLLECTED FROM THE NORTH LAKE. THE ORGANIC COMPOUNDS CONSISTED OF CHLORINATED PESTICIDES, POLYCHLORINATED BIPHENYLS (PCBS), AND POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS). CONCENTRATION RANGES ARE AS FOLLOWS: PESTICIDES - 3.4 TO 120 UG/L; PCBS - 500 TO 900 UG/KG; AND PAHS - 500 TO 3,000 UG/KG. SINCE THESE ORGANICS WERE DETECTED IN THE SEDIMENTS OF THE FORMER BORROW PITS, AND CONSIDERING THE INSOLUBLE NATURE OF THESE ORGANICS, RISKS TO HUMAN HEALTH OR THE ENVIRONMENT FROM EXPOSURE TO THESE ORGANIC COMPOUNDS WOULD LIKELY BE NEGLIGIBLE.
- RESULTS FROM ANALYSES OF THE TWO SOIL SAMPLES COLLECTED FROM THE SITE AREA INDICATED THE PRESENCE OF METALS CHARACTERISTIC OF A CARBONATE ROCK ENVIRONMENT. RESULTS FROM ORGANIC ANALYSIS DID NOT INDICATE THE PRESENCE OF ANY TARGET COMPOUNDS AT SIGNIFICANT CONCENTRATIONS.

III. H. J. ROSS ASSOCIATES LANDFILL CLOSURE STUDY (1986)

- AMMONIA WAS DETECTED AMONG THE GROUNDWATER SAMPLES AT CONCENTRATIONS RANGING FROM 7.3 TO 561 MG/L, WITH THE HIGHEST CONCENTRATION REPORTED IN THE SAMPLE COLLECTED FROM A WELL ADJACENT TO THE NORTHWEST LAKE.
- AMMONIA WAS DETECTED AMONG THE SURFACE WATER SAMPLES AT CONCENTRATIONS RANGING FROM

3.3 TO 59.6 MG/L WITH THE HIGHEST CONCENTRATION REPORTED IN A SAMPLE COLLECTED FROM A MID-DEPTH IN THE EAST LAKE.

IV. EPA RI/FS (1988)

- RESULTS FROM ANALYSIS OF GROUNDWATER SAMPLES INDICATED THE PRESENCE OF A VARIETY OF ORGANIC AND INORGANIC CHEMICALS. HOWEVER, MOST OF THESE CONTAMINANTS WERE DETECTED AT LOW CONCENTRATIONS WITH A FEW OF THE CHEMICALS EXCEEDING FEDERAL AND STATE WATER QUALITY PUBLIC HEALTH-BASED STANDARDS. SINCE THE WATER IN THE VICINITY OF THE SITE IS NOT USED FOR POTABLE OR IRRIGATION PURPOSES, IT WAS DETERMINED THAT THE CONTAMINANTS IN THE GROUNDWATER PRESENT INSIGNIFICANT RISK TO PUBLIC HEALTH. A DISTRIBUTION OF CHEMICALS DETECTED AMONG GROUNDWATER SAMPLES COLLECTED FROM THE SITE IS PROVIDED IN APPENDIX C (TABLES C-1 AND C-2).
- ANALYSES OF SURFACE WATER AND SEDIMENT SAMPLES INDICATE LOW-LEVEL CONTAMINATION BY A VARIETY OF MOSTLY INORGANIC CHEMICALS TYPICAL OF A NON-HAZARDOUS WASTE LANDFILL. CONCENTRATIONS OF SEVERAL OF THESE CHEMICALS EXCEEDED APPLICABLE WATER QUALITY STANDARDS AMONG THE SAMPLES COLLECTED. MOREOVER, CONCENTRATIONS OF SEVERAL OF THE CHEMICALS EXCEEDED ACUTE AND/OR CHRONIC EPA AMBIENT WATER QUALITY CRITERIA AND/OR FDER WATER QUALITY CRITERIA. THE DISTRIBUTION OF CHEMICALS DETECTED AMONG SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM THE SITE AND SURROUNDING AREAS IS PROVIDED IN APPENDIX C (TABLES C-3 THROUGH C-7).
- ANALYSES OF SOIL SAMPLES INDICATED THE PRESENCE OF CHEMICALS TYPICALLY ASSOCIATED WITH NON-HAZARDOUS MUNICIPAL LANDFILLS. SAMPLES COLLECTED FROM UNFILLED AREAS INDICATED LITTLE CONTAMINATION. SAMPLES COLLECTED FROM THE LANDFILL SURFACE AND NORTHEAST PORTION OF THE LANDFILL, HOWEVER, CONTAINED SEVERAL CONTAMINANTS AT CONCENTRATIONS ABOVE BACKGROUND. THE DISTRIBUTION OF CHEMICALS DETECTED AMONG SOIL SAMPLES COLLECTED FROM THE SITE IS PROVIDED IN APPENDIX C (TABLE C-8 THROUGH C-10).
- RESULTS FROM THE BIOASSAYS AND BIOACCUMULATION TESTS REVEALED VARYING DEGREES OF TOXICITY. ACUTE TOXICITY TESTS CONDUCTED ON THE FOUR GROUNDWATER SAMPLES INDICATED SEVERE TOXICITY IN THE TWO SAMPLES COLLECTED FROM THE NORTH AND CENTRAL PORTIONS OF THE LANDFILL. THE OTHER TWO SAMPLES REVEALED NO SIGNIFICANT ACUTE TOXICITY. CHRONIC TOXICITY WAS TYPICALLY OBSERVED AMONG THE AQUATIC SPECIES EXPOSED TO GROUNDWATER SAMPLES COLLECTED FROM THE LANDFILL AREA.

ACUTE TOXICITY TESTS CONDUCTED USING SURFACE WATER SAMPLES COLLECTED FROM THE LANDFILL AND BAY SIDE OF THE DIKE DEMONSTRATED VERY LOW OR POSSIBLY NO TOXICITY. HOWEVER, SHORT-TERM CHRONIC EFFECTS WERE OBSERVED IN TWO OF THE ORGANISMS EXPOSED TO THE SURFACE WATER SAMPLES.

CHEMICAL CONTAMINANTS RESPONSIBLE FOR THE OBSERVED TOXIC EFFECTS WERE DIFFICULT TO IDENTIFY DUE TO THE COMPLEX CHEMICAL MIXTURE REPRESENTED IN THE SAMPLES. AMONG THE CHEMICALS IDENTIFIED, AMMONIA WAS PRESENT IN CONCENTRATIONS THAT COULD HAVE CAUSED THE TOXICITY SHOWN IN THE BIOASSAYS. OTHER CHEMICALS PRESENT AT CONCENTRATIONS IN EXCESS OF WATER QUALITY CRITERIA MAY HAVE CONTRIBUTED TO THE TOXICITY. HOWEVER, AMMONIA APPEARED TO BE THE BEST INDICATOR OF THE TOXICITY.

RESULTS FROM THE BIOACCUMULATION STUDY DID NOT PROVIDE ANY CONCLUSIVE EVIDENCE THAT CHEMICALS ASSOCIATED WITH THE LANDFILL ARE BIOACCUMULATING IN THE TISSUE OF INDIGENOUS FISH AND INVERTEBRATES AT CONCENTRATIONS ABOVE THOSE FOUND IN THE SAME SPECIES COLLECTED ELSEWHERE IN BISCAYNE BAY.

V. EPA WATER QUALITY AND TOXIC ASSESSMENT STUDY, MANGROVE PRESERVE (1989)

- RESULTS OF THE BIOASSAYS IN WHICH AQUATIC TEST ORGANISMS WERE EXPOSED TO SURFACE WATER COLLECTED FROM THE MANGROVE PRESERVE DEMONSTRATED SEVERE ADVERSE EFFECTS IN THREE OF THE FOUR MARINE SPECIES TESTED. THE OBSERVED TOXIC EFFECTS APPEARED TO BE LIMITED TO EXCESSIVE LEVELS OF UN-IONIZED AMMONIA AND OTHER UNKNOWN TOXICANTS OF THE LEACHATE.
- SIGNIFICANT LEVELS OF BOTH ACUTE AND CHRONIC TOXICITY WERE OBSERVED IN THREE OF THE FOUR REFERENCE POINTS, INCLUDING BISCAYNE BAY, BISCAYNE CREEK, AND DANIA CUTOFF CANAL. HOWEVER, IN COMPARISON TO THE TOXICITY OBSERVED IN SURFACE WATER SAMPLES COLLECTED FROM THE MANGROVE PRESERVE, THE TOXICITY WAS CONSIDERABLY LOWER. THIS IS EVIDENCED BY FIGURES 4 AND 5, WHICH COMPARE OBSERVED TOXICITIES AMONG SURFACE WATER SAMPLES COLLECTED FROM THE MANGROVE PRESERVE AND BISCAYNE BAY. FIGURE 4 ILLUSTRATES TOXIC EFFECTS THAT WERE OBSERVED USING SAMPLES COLLECTED AT LOW TIDE, WHILE FIGURE 5 ILLUSTRATES EFFECTS USING SAMPLES COLLECTED AT HIGH TIDE. AS EVIDENCED BY THE FIGURES, THE MOST SEVERE TOXIC EFFECTS WERE OBSERVED AT LOW TIDE. IN EITHER CASE, TOXIC EFFECTS IN THE SAMPLE COLLECTED FROM BISCAYNE BAY WERE SIGNIFICANTLY LESS THAN THAT OBSERVED IN SAMPLES COLLECTED FROM THE MANGROVE PRESERVE.
- TIDAL STAGE WAS DETERMINED TO BE A PRIMARY FACTOR AFFECTING THE EMERGENCE OF LEACHATE IN THE MANGROVE PRESERVE. ON EACH EBBING PHASE OF THE TIDE, UPWELLING OF LEACHATE INCREASED TO LEVELS THAT WERE SEVERELY TOXIC TO AQUATIC LIFE. DURING THE FLOODING STAGE, THE EFFECTS WERE REDUCED THROUGH DILUTION, BUT NOT ELIMINATED.
- ASSESSMENT OF POTENTIAL NUTRIENT ENRICHMENT EFFECTS OF SURFACE WATER FROM THE MANGROVE PRESERVE ON BISCAYNE BAY COULD NOT BE COMPLETED DUE TO THE SEVERE TOXIC EFFECTS OF THE PRESERVE SURFACE WATER ON THE MARINE TEST ALGA.

THE PREVIOUS DISCUSSIONS PROVIDE A BRIEF OVERVIEW OF THE FINDINGS OF THE MAJOR STUDIES THAT HAVE BEEN CONDUCTED AT THE SITE TO DATE. AS DISCUSSED EARLIER, A MORE DETAILED DISCUSSION OF THESE RESULTS CAN BE FOUND IN THE INVESTIGATION REPORTS THAT ARE MAINTAINED IN THE AR FILE AND INFORMATION REPOSITORY FOR THIS SITE. OVERALL, THESE RESULTS SHOW THAT CONTAMINANTS PRESENT IN SAMPLES COLLECTED FROM VARIOUS MEDIA AT THE LANDFILL DO NOT REPRESENT A THREAT TO PUBLIC HEALTH OR WELFARE, AS MORE FULLY EXPLAINED IN SECTION 7.1. HOWEVER, SAMPLES COLLECTED FROM ONSITE SURFACE WATERS AND WATER FROM THE MANGROVE PRESERVE IN ADDITION TO GROUNDWATER SAMPLES COLLECTED FROM NUMEROUS LOCATIONS CONTAINED CONTAMINANTS, PRIMARILY UN-IONIZED AMMONIA, AT CONCENTRATIONS THAT ARE SEVERELY TOXIC TO AQUATIC LIFE.

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SUMMARY OF SITE RISKS

THE FOLLOWING SECTIONS SUMMARIZE THE RISKS TO HUMAN HEALTH AND THE ENVIRONMENT THAT ARE OR MAY BE POSED BY THE MUNISPORT SITE. THE HUMAN HEALTH SECTION EVALUATES THE RISKS IN TERMS OF CONTAMINANTS OF CONCERN, EXPOSURE, TOXICITY, AND RISKS. THE ENVIRONMENTAL SECTION EVALUATES THE CONTAMINANTS OF CONCERN, CHARACTERISTICS OF THE ENVIRONMENT, AND BIOLOGICAL FACTORS.

HUMAN HEALTH RISKS

RISKS TO HUMAN HEALTH WERE EVALUATED USING DATA COLLECTED AS PART OF THE EPA RI/FS CONDUCTED DURING THE PERIOD 1986 THROUGH 1987.

CONTAMINANTS OF CONCERN

RESULTS FROM ANALYSES OF GROUNDWATER, SURFACE WATER, SEDIMENT, AND SOIL SAMPLES COLLECTED FROM LOCATIONS ON OR NEAR THE MUNISPORT LANDFILL WERE REVIEWED TO DETERMINE THE CONTAMINANTS OF

CONCERN.

IN LOCATIONS SUCH AS MUNICIPAL LANDFILLS WHERE THE NATURE OF DISPOSED WASTES IS UNKNOWN, IT IS DIFFICULT TO DETERMINE WHETHER OR NOT THE CHEMICALS DETECTED ARE A DIRECT RESULT OF SPECIFIC WASTE DISPOSAL ACTIVITIES THAT OCCURRED AT THE FACILITY. IN SOME INSTANCES, THE CHEMICALS DETECTED MAY BE THE DIRECT RESULT OF MUNICIPAL WASTE CONTAINING HAZARDOUS CONSTITUENTS OR THEY MAY BE A BY-PRODUCT OF THE ENVIRONMENT IN WHICH THE FACILITY IS LOCATED. AS A RESULT, CONTAMINANTS OF CONCERN ARE TYPICALLY IDENTIFIED ON THE BASIS OF CONCENTRATIONS THAT ARE ELEVATED ABOVE BACKGROUND CONCENTRATIONS FOR THE AREA. A COMPLICATING FACTOR IS THE NATURE OF BACKGROUND IN AN URBAN AREA SUCH AS THIS. HENCE, CONTAMINANTS THAT WERE DETECTED IN SAMPLES COLLECTED FROM THE LANDFILL AT CONCENTRATIONS ABOVE BACKGROUND WERE IDENTIFIED AS POTENTIAL CONTAMINANTS OF CONCERN. A LIST OF THESE CONTAMINANTS IS PROVIDED IN TABLE 1. APPENDIX C CONTAINS DATA TABLES THAT SUMMARIZE CONTAMINANT CONCENTRATIONS ON WHICH THE RISK ASSESSMENT IS BASED.

AMONG THE CHEMICALS LISTED IN TABLE 1, ONLY THOSE WITH ADEQUATE TOXICITY INFORMATION WERE ASSESSED FOR POTENTIAL CONTRIBUTION TO OVERALL RISKS. WHILE SPECIFIC HEALTH-BASED CRITERIA WERE NOT AVAILABLE FOR A NUMBER OF THE CONTAMINANTS OF CONCERN, ANALYSIS (OR ASSESSMENT) OF THE EXISTING/AVAILABLE DATA INDICATES A RELATIVELY LOW ORDER OF TOXICITY. WHEN COMPARED TO OTHER CONTAMINANTS OF CONCERN, WHICH ARE KNOWN TO HAVE POTENTIAL FOR ADVERSE HEALTH-EFFECTS, THE COMPOUNDS OF LOW TOXICITY DO NOT APPEAR TO POSE A SIGNIFICANT INCREMENTAL RISK AND ARE NOT INCLUDED IN THE RISK ASSESSMENT.

TOXICITY DATA THAT WERE USED IN THE TOXICITY ASSESSMENT INCLUDED ENVIRONMENTAL STANDARDS, CRITERIA, ARARS FROM FEDERAL AND STATE ENVIRONMENTAL LAWS, AND/OR CRITICAL TOXICITY VALUES SUCH AS REFERENCE DOSES FOR NON-CARCINOGENS AND CANCER POTENCY FACTORS FOR CARCINOGENS. ARARS ARE THOSE CLEANUP STANDARDS, STANDARDS OF CONTROL, AND OTHER SUBSTANTIVE ENVIRONMENTAL PROTECTION REQUIREMENTS PROMULGATED UNDER FEDERAL OR STATE LAW THAT SPECIFICALLY ADDRESS A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION, LOCATION, OR OTHER CIRCUMSTANCE AT A SUPERFUND SITE, OR THAT ADDRESS PROBLEMS OR SITUATIONS SUFFICIENTLY SIMILAR TO THOSE ENCOUNTERED AT THE SUPERFUND SITE THAT THEIR USE IS WELL SUITED TO THE PARTICULAR SITE. ARARS IDENTIFIED FOR THIS SITE ARE USED TO ESTABLISH CLEANUP STANDARDS FOR THE REMEDIAL ACTION.

EXPOSURE ASSESSMENT

BASED ON AN EVALUATION OF VARIOUS ENVIRONMENTAL FACTORS AFFECTING THE MIGRATION OF CONTAMINANTS, SUCH AS HYDROGEOLOGIC OR PHYSICOCHEMICAL CONDITIONS OF THE ENVIRONMENT AND THE PHYSICOCHEMICAL CHARACTERISTICS OF THE CONTAMINANTS, TWO METHODS BY WHICH CONTAMINANTS MAY REALISTICALLY MIGRATE FROM THE MUNISPORT LANDFILL WERE IDENTIFIED. THE FIRST METHOD IDENTIFIED WAS THE LEACHING OF ORGANIC CHEMICALS THAT DO NOT READILY BIND TO SOILS AND THE LEACHING OF AMMONIA FROM SOILS OR WASTES INTO THE GROUNDWATER. THE SECOND METHOD IDENTIFIED WAS THE TRANSPORT OF CONTAMINANTS WITH THE GROUNDWATER FLOW AND SUBSEQUENT DISCHARGE INTO NEARBY SURFACE WATERS.

UNDER CURRENT CONDITIONS, IT WAS DETERMINED THAT THE ONLY VIABLE ROUTE OF HUMAN EXPOSURE TO THE CONTAMINANTS OF CONCERN WAS VIA THE INGESTION OF FISH OBTAINED FROM SURFACE WATERS ON OR NEAR THE MUNISPORT PROPERTY. OTHER EXPOSURE PATHWAYS (I.E., EXPOSURE TO CHEMICALS OF CONCERN IN THE GROUNDWATER, SOIL, OR SEDIMENTS) WERE ALSO EVALUATED. HOWEVER, THESE PATHWAYS WERE DETERMINED NOT TO BE VIABLE EXPOSURE PATHWAYS DUE TO A LACK OF RECEPTORS, SUCH AS PEOPLE CURRENTLY USING AREA GROUNDWATER FOR POTABLE OR IRRIGATION PURPOSES. A SUMMARY OF THE POTENTIAL PATHWAYS OF EXPOSURE UNDER CURRENT SITE CONDITIONS IS PROVIDED IN TABLE 2.

FUTURE EXPOSURES WERE ALSO EVALUATED BASED ON SEVERAL DIFFERENT SCENARIOS REGARDING FUTURE USE OF THE MUNISPORT PROPERTY. THE EXPOSURE PATHWAYS THAT MAY BE VIABLE AND SIGNIFICANTLY CONTRIBUTE TO RISKS IN THE FUTURE INCLUDE DERMAL CONTACT AND INGESTION OF SURFACE WATERS BY

FUTURE SWIMMERS IN THE AREA AND DERMAL CONTACT AND INCIDENTAL INGESTION OF SOIL BY FUTURE RESIDENTS, WORKERS, AND RECREATIONAL USERS OF THE AREA. SWIMMING EXPOSURE WAS QUANTIFIED FOR SWIMMERS IN THE ONSITE LAKES. SOIL EXPOSURE WAS QUANTIFIED FOR FUTURE RESIDENTS POTENTIALLY LIVING IN THREE DIFFERENT AREAS OF THE MUNISPORT PROPERTY. EXPOSURE OF FUTURE WORKERS AND RECREATIONAL USERS WAS QUANTITATIVELY EVALUATED. THE POTENTIAL FOR FUTURE GROUNDWATER EXPOSURE WAS NOT ASSESSED SINCE IT WAS DETERMINED THAT THE QUALITY OF THE GROUNDWATER WITH REGARD TO TOTAL CHLORIDE CONTENT (AS A RESULT OF SALTWATER INTRUSION) WILL NOT LIKELY IMPROVE IN THE FUTURE TO A DEGREE THAT AREA GROUNDWATER COULD BE USED FOR POTABLE PURPOSES. FINALLY, OTHER PATHWAYS WERE NOT EVALUATED BECAUSE THEY WERE DETERMINED NOT TO BE VIABLE OR WERE DETERMINED NOT TO CONTRIBUTE SIGNIFICANTLY TO OVERALL EXPOSURE AND RISK. A SUMMARY OF THE POTENTIAL PATHWAYS OF EXPOSURE UNDER FUTURE CONDITIONS IS PROVIDED IN TABLE 3.

TOXICITY ASSESSMENT

TO ASSESS THE POSSIBLE TOXICOLOGICAL EFFECTS FROM EXPOSURE TO HAZARDOUS SUBSTANCES, HEALTH EFFECTS CRITERIA ARE DERIVED FROM A REVIEW OF HEALTH AND ENVIRONMENTAL STANDARDS AND PUBLISHED TOXICOLOGICAL STUDIES.

FOR ASSESSMENT PURPOSES, INDIVIDUAL POLLUTANTS ARE SEPARATED INTO TWO CATEGORIES OF CHEMICAL TOXICITY, DEPENDING ON WHETHER THEY EXHIBIT CARCINOGENIC (CANCER-CAUSING) OR NONCARCINOGENIC EFFECTS. THIS DISTINCTION RELATES TO THE CURRENT SCIENTIFIC OPINION THAT THE MECHANISM WHICH PRODUCES EACH EFFECT IS DIFFERENT AND DISTINCT.

CARCINOGENS:

CANCER POTENCY FACTORS (CPFS) HAVE BEEN DEVELOPED BY EPA'S CARCINOGEN ASSESSMENT GROUP FOR ESTIMATING EXCESS LIFETIME CANCER RISKS ASSOCIATED WITH EXPOSURE TO POTENTIAL CARCINOGENS, IN AN EFFORT TO PROVIDE AN UPPER-BOUND ESTIMATE OF THE LIFETIME CANCER RISK ASSOCIATED WITH EXPOSURE AT A PARTICULAR INTAKE LEVEL. THE TERM "UPPER BOUND" REFLECTS THE CONSERVATIVE ESTIMATE OF THE RISKS CALCULATED FROM THE CPF. USE OF THIS APPROACH MAKES UNDERESTIMATION OF THE ACTUAL CANCER RISK HIGHLY UNLIKELY. CANCER POTENCY FACTORS ARE DERIVED FROM THE RESULTS OF HUMAN EPIDEMIOLOGICAL STUDIES OR CHRONIC ANIMAL BIOASSAYS TO WHICH ANIMAL-TO-HUMAN EXTRAPOLATION AND UNCERTAINTY FACTORS HAVE BEEN APPLIED.

NON-CARCINOGENS:

REFERENCE DOSES (RFDs) HAVE BEEN DEVELOPED BY EPA TO INDICATE THE POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM EXPOSURE TO CHEMICALS EXHIBITING NON-CARCINOGENIC EFFECTS. RFDs, WHICH ARE EXPRESSED IN UNITS OF MG/KG-DAY, ARE ESTIMATES OF LIFETIME DAILY EXPOSURE LEVELS FOR HUMANS, INCLUDING SENSITIVE INDIVIDUALS (E.G., CHILDREN, ELDERLY PEOPLE, ETC.). ESTIMATED INTAKES OF CHEMICALS FROM ENVIRONMENTAL MEDIA (E.G., THE AMOUNT OF A CHEMICAL INGESTED FROM CONTAMINATED DRINKING WATER) CAN BE COMPARED TO THE RFD. RFDs ARE DERIVED FROM ANIMAL STUDIES TO WHICH UNCERTAINTY FACTORS HAVE BEEN APPLIED (E.G., TO ACCOUNT FOR THE USE OF ANIMAL DATA TO PREDICT EFFECTS ON HUMANS) OR DIRECTLY FROM HUMAN EPIDEMIOLOGICAL STUDIES. THESE UNCERTAINTY FACTORS HELP ENSURE THAT THE RFDs WILL NOT UNDERESTIMATE THE POTENTIAL FOR ADVERSE NON-CARCINOGENIC EFFECTS TO OCCUR.

THE HEALTH EFFECTS CRITERIA FOR CARCINOGENS AND NON-CARCINOGENS THAT WERE DETERMINED TO BE APPROPRIATE FOR THIS SITE ARE PROVIDED IN TABLE 4. THIS TABLE PRESENTS HEALTH EFFECTS CRITERIA THAT WERE USED TO EVALUATE RISKS POSED BY CARCINOGENS PRESENT IN SURFACE WATER, SOILS, AND FISH. NO HEALTH EFFECTS CRITERIA FOR EXPOSURE TO SITE-RELATED CONTAMINANTS THROUGH INHALATION OR EXPOSURE TO CONTAMINANTS FOUND IN GROUNDWATER OR SEDIMENTS ARE INCLUDED IN TABLE 4. CONSIDERING THE CONTAMINANT CONCENTRATIONS, EXPOSURE PATHWAYS, AND RECEPTORS, IT WAS DETERMINED THAT RISKS FROM EXPOSURE OF THOSE CONTAMINANTS WOULD BE NEGLIGIBLE. FINALLY, ALTHOUGH CRITERIA WERE NOT

AVAILABLE FOR SOME OF THE CONTAMINANTS OF CONCERN, THE AVAILABLE DATA INDICATE THAT THESE CHEMICALS HAVE RELATIVELY LOW TOXICITY IN COMPARISON WITH MANY OF THE OTHER CHEMICALS BEING EVALUATED AND CONSEQUENTLY, DO NOT APPEAR POSE A SIGNIFICANT INCREMENTAL RISK.

CHARACTERIZATION OF RISKS

RISKS FROM THE EXPOSURES IDENTIFIED IN THE TWO PREVIOUS SECTIONS WERE EVALUATED FIRST BY COMPARING CONCENTRATIONS OF CHEMICALS IN THE CONTAMINATED EXPOSURE MEDIUM (I.E., SURFACE WATER AND SOIL) AT POINTS OF POTENTIAL EXPOSURE WITH STATE OF FLORIDA AND FEDERAL ENVIRONMENTAL STANDARDS, CRITERIA, OR GUIDANCE THAT WERE IDENTIFIED ARARS. HOWEVER, ARARS WERE NOT AVAILABLE FOR ALL CHEMICALS IN ALL MEDIA. A COMPLETE QUANTITATIVE ASSESSMENT OF RISKS ASSOCIATED WITH HUMAN EXPOSURES TO CHEMICALS OF POTENTIAL CONCERN IN SURFACE WATER AND IN SOIL COULD NOT, THEREFORE, BE PERFORMED. QUANTITATIVE RISK ASSESSMENT INVOLVES ESTIMATING INTAKES (DOSES) BY POTENTIALLY EXPOSED POPULATIONS BASED ON THE ASSUMED EXPOSURE SCENARIO. THESE INTAKES ARE THEN COMBINED WITH CANCER POTENCY FACTORS OR COMPARED WITH RFDS TO ASSESS LIFETIME CANCER RISKS OR DERIVE ESTIMATES OF NONCARCINOGENIC HAZARDS, RESPECTIVELY, TO THE POTENTIALLY EXPOSED POPULATIONS.

EXCESS LIFETIME CANCER RISKS ARE DETERMINED BY MULTIPLYING THE INTAKE LEVEL BY THE CANCER POTENCY FACTOR. THESE RISKS ARE PROBABILITIES THAT ARE GENERALLY EXPRESSED IN SCIENTIFIC NOTATION (E.G., $1 \times (10^{-6})$) OR $(1E-6)$. AN EXCESS LIFETIME CANCER RISK OF $1 \times (10^{-6})$ INDICATES THAT AS A PLAUSIBLE UPPER BOUND, AN INDIVIDUAL HAS A ONE IN A MILLION CHANCE OF DEVELOPING CANCER ABOVE THE BACKGROUND RISK AS A RESULT OF SITE-RELATED EXPOSURE TO A CARCINOGEN OVER A 70-YEAR LIFETIME UNDER THE SPECIFIC EXPOSURE CONDITIONS AT THE SITE.

POTENTIAL CONCERN FOR NON-CARCINOGENIC EFFECTS OF A SINGLE CONTAMINANT IN A SINGLE MEDIUM IS EXPRESSED AS THE HAZARD QUOTIENT (HQ) (OR THE RATIO OF THE ESTIMATED INTAKE DERIVED FROM THE CONTAMINANT CONCENTRATIONS IN A GIVEN MEDIUM TO THE CONTAMINANT'S REFERENCE DOSE). BY ADDING THE HQS FOR ALL CONTAMINANTS WITHIN A MEDIUM OR ACROSS ALL MEDIA TO WHICH A GIVEN POPULATION MAY REASONABLY BE EXPECTED TO BE EXPOSED, THE HAZARD INDEX (HI) CAN BE GENERATED. THE HI PROVIDES A USEFUL REFERENCE POINT FOR GAUGING THE POTENTIAL SIGNIFICANCE OF MULTIPLE CONTAMINANT EXPOSURES WITHIN A SINGLE MEDIUM OR ACROSS MEDIA.

THE AGENCY NORMALLY CONSIDERS A RANGE OF CANCER RISKS BETWEEN $1 \times (10^{-4})$ TO $1 \times (10^{-6})$ AS PROTECTIVE, BUT USES A RISK LEVEL OF $1 \times (10^{-6})$ AS A POINT OF DEPARTURE FOR SETTING CLEANUP LEVELS AT SUPERFUND SITES. CONSEQUENTLY, A $1 \times (10^{-6})$ RISK LEVEL (I.E., ONE EXCESS CANCER PER MILLION POPULATION EXPOSED FOR A LIFETIME) WAS USED AS A BENCHMARK FOR THIS ASSESSMENT.

THE MAJOR CONCLUSIONS OF THIS HUMAN HEALTH RISK ASSESSMENT FOR THE MUNISPORT SITE ARE SUMMARIZED BELOW.

COMPARISON TO ARARS

CHEMICALS DETECTED IN SAMPLES COLLECTED FROM VARIOUS GROUNDWATER AND SURFACE WATER LOCATIONS ON AND NEAR TO THE MUNISPORT PROPERTY WERE COMPARED TO THEIR CHEMICAL-SPECIFIC ARARS. PURSUANT TO SECTION 121(D)(2)(A) OF CERCLA, AS AMENDED, ARARS ARE DEFINED AS FEDERALLY OR STATE PROMULGATED CLEANUP STANDARDS, STANDARDS OF CONTROL, AND OTHER SUBSTANTIVE ENVIRONMENTAL PROTECTION REQUIREMENTS. AS SUCH, ONLY FEDERALLY AND STATE PROMULGATED STANDARDS WERE USED IN THE COMPARISON. OTHER LOCAL STANDARDS WERE NOT INCLUDED AS ARARS IN THIS COMPARISON.

ALTHOUGH VARIOUS CHEMICALS WERE DETECTED IN GROUNDWATER SAMPLES COLLECTED FROM THE SITE AND CHEMICAL-SPECIFIC STANDARDS EXIST FOR SOME OF THESE CONSTITUENTS, THE STANDARDS WERE DETERMINED NOT TO BE RELEVANT AND APPROPRIATE. THIS PORTION OF THE BISCAYNE AQUIFER IS CLASSIFIED AS A CLASS G-III (NON-POTABLE) AQUIFER PURSUANT TO SECTION 17-3.401 OF THE FAC. AS A RESULT,

DRINKING WATER STANDARDS SUCH AS MAXIMUM CONTAMINANT LEVELS (MCLS) OR MAXIMUM CONTAMINANT LEVEL GOALS (MCLGS) DEVELOPED FOR THE PROTECTION OF HUMAN HEALTH WERE NOT CONSIDERED APPLICABLE OR RELEVANT AND APPROPRIATE AND THEREFORE WERE NOT COMPARED TO THE CHEMICALS DETECTED IN THE GROUNDWATER.

WITH REGARD TO SAMPLES COLLECTED FROM SURFACE WATER BODIES LOCATED ON OR NEAR TO THE MUNISPORT PROPERTY, CONCENTRATIONS OF CHEMICALS DETECTED WERE COMPARED TO WATER QUALITY CRITERIA DEVELOPED FOR THE PROTECTION OF HUMANS AND AQUATIC LIFE FROM SURFACE WATER EXPOSURES. IN THE ONSITE LAKES (FORMER BORROW PITS), THE MEAN AND MAXIMUM CONCENTRATIONS OF UN-IONIZED AMMONIA AND THE MAXIMUM CONCENTRATIONS OF COPPER, IRON, AND ZINC EXCEEDED THE STANDARDS ESTABLISHED BY THE STATE OF FLORIDA FOR THESE CHEMICALS IN PREDOMINANTLY FRESH WATERS. HOWEVER, IT IS NOT CLEAR FROM THE CURRENT DATA IF ALL THESE CHEMICALS WERE TRULY ELEVATED ABOVE BACKGROUND. ALTHOUGH NEITHER COPPER NOR IRON WAS DETECTED IN THE BACKGROUND SAMPLE, THE MAXIMUM CONCENTRATION OF COPPER IN THE ONSITE LAKES WAS CLOSE TO THE BACKGROUND DETECTION LIMIT AND THE MAXIMUM CONCENTRATION OF IRON IN THE LAKES WAS MUCH LOWER THAN THE BACKGROUND DETECTION LIMIT. THEREFORE, THE MAXIMUM CONCENTRATIONS OF COPPER AND IRON IN THE ONSITE LAKES MAY BE WITHIN THE RANGE OF TYPICAL BACKGROUND LEVELS, ALBEIT AT LEVELS THAT EXCEED FLORIDA STANDARDS.

IN THE OLETA RIVER AND TRIBUTARIES, OF THE AVAILABLE ARARS (E.G., NO ARAR WAS AVAILABLE FOR UNIONIZED AMMONIA IN SALTWATER), THE MEAN AND MAXIMUM CONCENTRATION OF COPPER EXCEEDED THE STATE OF FLORIDA STANDARD FOR COPPER IN PREDOMINANTLY MARINE WATERS. AGAIN, IT IS NOT KNOWN IF COPPER WAS ACTUALLY ELEVATED ABOVE BACKGROUND BECAUSE COPPER WAS NOT DETECTED IN THE BACKGROUND SAMPLE FROM THE OLETA RIVER. MOREOVER, THE DETECTION LIMIT WAS CLOSE TO THE MEAN AND MAXIMUM SAMPLE CONCENTRATIONS.

FINALLY, IN THE MANGROVE AREAS SOUTH AND EAST OF THE MUNISPORT PROPERTY, THE MAXIMUM CONCENTRATIONS OF ALUMINUM, COPPER, IRON, AND SILVER EXCEEDED THE STATE OF FLORIDA STANDARDS ESTABLISHED FOR THESE CHEMICALS IN PREDOMINANTLY MARINE WATERS. A COMPARISON OF THE CONCENTRATIONS OF THESE CHEMICALS ALONG WITH THEIR RESPECTIVE ARARS IS PROVIDED IN TABLE 5.

ESTIMATES OF HUMAN RISK UNDER CURRENT USE

AS DISCUSSED IN SECTION 7.1.2, EXPOSURE ASSESSMENT, THE ONLY VIABLE PATHWAY OF EXPOSURE IS INGESTION OF CONTAMINATED FISH. DIRECT HUMAN EXPOSURE TO CONTAMINATED GROUNDWATER OR SURFACE WATER WAS NOT CONSIDERED VIABLE SINCE THERE ARE NO PATHWAYS OF EXPOSURE OR RECEPTORS.

FOR INGESTION OF FISH FROM THE ONSITE LAKES (FORMER BORROW PITS) AND THE OLETA RIVER AND TRIBUTARIES, THE HAZARD INDEX FOR NON-CARCINOGENS IS LESS THAN ONE UNDER THE AVERAGE AND PLAUSIBLE MAXIMUM CASES. NO POTENTIAL CARCINOGENS WERE DETECTED IN SURFACE WATER. HOWEVER, BOTH CARCINOGENS AND NON-CARCINOGENS WERE DETECTED IN FISH TISSUE FROM MANGROVE AREAS SOUTH AND EAST OF THE MUNISPORT PROPERTY. FOR INGESTION OF FISH FROM THE SOUTH AND EAST MANGROVE AREAS, THE EXCESS LIFETIME CANCER RISKS UNDER THE AVERAGE AND PLAUSIBLE MAXIMUM CASES BASED ON MEASURED TISSUE LEVELS ARE $2 \times (10^{-5})$ AND $2 \times (10^{-4})$, RESPECTIVELY. RISKS UNDER BOTH CASES ARE DUE TO POTENTIAL ARSENIC AND PCB EXPOSURE. TWO FACTORS, HOWEVER, SHOULD BE CONSIDERED IN INTERPRETING THESE RISKS LEVELS. FIRST, THE EXPOSURE SCENARIO IS VERY CONSERVATIVE IN THAT IT ASSUMES A FISH CONSUMPTION AMOUNT PER PERSON THAT MAY OVERESTIMATE THE RISK(S). SECONDLY, ATTRIBUTING THE TWO CHEMICALS, FOR WHICH THE RISKS WERE CALCULATED, TO THE MUNISPORT LANDFILL IS QUESTIONABLE, SINCE THERE IS NO DOCUMENTATION CONCERNING THE DISPOSAL OF ARSENIC-CONTAINING COMPOUNDS AT THE LANDFILL NOR DO THE ANALYTICAL DATA INDICATE THAT ARSENIC IS PRESENT AT THE LANDFILL IN QUANTITIES THAT COULD RESULT IN SIGNIFICANT FISH CONTAMINATION. WITH REGARD TO THE ATTRIBUTION OF PCBs, THEY ARE UBIQUITOUS COMPOUNDS CHARACTERISTIC OF THE EFFECTS OF URBANIZATION. FURTHERMORE, THE ANALYTICAL DATA DO NOT INDICATE THE PRESENCE OF QUANTITIES OF PCB'S THAT COULD RESULT IN SIGNIFICANT FISH CONTAMINATION. THEREFORE, THE USE OF THESE CHEMICALS IN THE ASSESSMENT OF RISKS MAY BE INAPPROPRIATE.

FOR NON-CARCINOGENIC EXPOSURE THROUGH FISH INGESTION, UNDER THE AVERAGE AND PLAUSIBLE MAXIMUM CASE, THE INDIVIDUAL RATIOS BETWEEN THE CHRONIC DAILY INTAKE (CDI) AND RFD, IN ADDITION TO THE CUMULATIVE HAZARD INDEX, WERE LESS THAN ONE. THIS INDICATES THAT THERE IS NO SIGNIFICANT HEALTH RISKS ASSOCIATED WITH THE CONSUMPTION OF FISH POTENTIALLY CONTAINING NON-CARCINOGENIC CHEMICALS.

THE CONCLUSION OF SIGNIFICANT CANCER RISK ASSOCIATED WITH THE INGESTION OF FISH FROM THE SOUTH AND EAST MANGROVE AREAS DOES NOT INDICATE THAT THESE RISKS ARE ASSOCIATED WITH THE MUNISPORT PROPERTY. AS THE ANALYSIS OF THE TISSUE DATA BY THE US FISH AND WILDLIFE SERVICE (FWS) STATED, THE TISSUE DATA DO NOT VERIFY THAT ANY OF THE COMPOUNDS DETECTED IN FISH FROM THE MUNISPORT LANDFILL ARE PRESENT AT CONCENTRATIONS ABOVE THOSE MEASURED IN FISH TAKEN FROM CONTROL AREAS. THEREFORE, ALTHOUGH THERE MAY BE INCREASED RISKS ASSOCIATED WITH THE INGESTION OF FISH FROM THE SOUTH AND EAST MANGROVE AREAS, THESE RISKS DO NOT APPEAR TO BE ASSOCIATED WITH THE MUNISPORT LANDFILL PROPERTY.

ESTIMATES OF HUMAN RISK UNDER FUTURE USE

IN THE ABSENCE OF FUTURE REMEDIAL ACTIONS AND INSTITUTIONAL ACTIONS LIMITING ACCESS TO THE SITE AND SURROUNDING AREA, THE ROUTES OF EXPOSURE QUANTIFIED FOR CURRENT USE ALSO WOULD APPLY IN THE FUTURE.

IN ADDITION, DIFFERENT LAND USE OF THE SITE IN THE FUTURE MAY RESULT IN ADDITIONAL EXPOSURES. AS DISCUSSED IN SECTION 7.1.2, EXPOSURE ASSESSMENT, POTENTIALLY VIABLE EXPOSURE PATHWAYS IN THE FUTURE INCLUDE DERMAL ABSORPTION AND INCIDENTAL INGESTION OF SOIL BY FUTURE RESIDENTS, WORKERS, AND/OR RECREATIONAL USERS OF THE SITE. DERMAL ABSORPTION AND INCIDENTAL INGESTION OF CHEMICALS IN SURFACE WATER BY PERSONS SWIMMING IN ONSITE BORROW PITS WAS ALSO CONSIDERED. UNDER THE ASSUMED FUTURE SITE USES, SOIL EXPOSURES COULD OCCUR IN ANY OF THE SITE AREAS EVALUATED, PARTICULARLY IF THE SITE IS REGRADED DURING FUTURE SITE USE; SUCH REGRADING WOULD EXPOSE THE SOILS AND WASTES AT GREATER DEPTHS.

SURFACE WATER EXPOSURE

FOR POTENTIAL SURFACE WATER EXPOSURES TO FUTURE SWIMMERS IN THE ONSITE LAKES, THE HAZARD INDEX FOR THE COMBINED DERMAL ABSORPTION AND INCIDENTAL INGESTION EXPOSURE TO NONCARCINOGENIC CHEMICALS DURING SWIMMING IS LESS THAN ONE. THE POTENTIAL RISKS FROM SWIMMING IN THE ONSITE LAKES ARE VERY CONSERVATIVE SINCE THE EXPOSURE ASSESSMENT ASSUMES THAT AREA RESIDENTS WOULD FREQUENT THE ONSITE LAKES (FORMER BORROW PITS) FOR SWIMMING. IT IS UNLIKELY THAT THESE LAKES WOULD ACTUALLY BE USED FOR SWIMMING SINCE, AS FORMER BORROW PITS, THE SIDES OF THE LAKES HAVE STEEP SLOPES WHICH WOULD MAKE ACCESS DIFFICULT.

THERE WERE NO CARCINOGENIC CHEMICALS OF POTENTIAL CONCERN DETECTED IN THE SURFACE WATERS.

SOIL EXPOSURE

RESIDENTS: FOR EXPOSURES OF FUTURE RESIDENTS VIA DIRECT CONTACT WITH SOILS IN THE LANDFILL AREA, THE LIFETIME EXCESS CANCER RISK IS LESS THAN $1 \times (10^{-6})$ ($6 \times (10^{-7})$) UNDER THE AVERAGE CASE AND GREATER THAN $1 \times (10^{-6})$ ($1 \times (10^{-4})$) UNDER THE PLAUSIBLE MAXIMUM CASE. THE CARCINOGENIC RISK UNDER THE PLAUSIBLE MAXIMUM CASE IS DUE TO POTENTIAL EXPOSURE TO ARSENIC AND CARCINOGENIC PAHS. THE ESTIMATION OF THE RISKS FROM THE POTENTIAL EXPOSURE TO THESE CONTAMINANTS SHOULD BE VIEWED AS A WORST CASE SCENARIO. THE FACT THAT THE CHEMICALS WERE NOT DETECTED FREQUENTLY ON OR AROUND THE LANDFILL AREA NOR WERE THEY TYPICALLY DETECTED AT CONCENTRATIONS SIGNIFICANTLY ABOVE LEVELS CHARACTERISTIC OF URBAN AREAS RAISES QUESTIONS AS TO WHETHER OR NOT POTENTIAL RISKS FROM EXPOSURE TO THESE CHEMICALS ARE REPRESENTATIVE OF ACTUAL LANDFILL CONDITIONS. FOR EXPOSURE TO NON-CARCINOGENS, THE HAZARD INDEX IS LESS THAN ONE UNDER BOTH THE AVERAGE AND PLAUSIBLE MAXIMUM EXPOSURE.

FOR POTENTIAL EXPOSURES TO FUTURE RESIDENTS FROM DIRECT CONTACT WITH SOILS IN THE LANDFILL PERIMETER AREAS, THE LIFETIME EXCESS CANCER RISK IS LESS THAN $1 \times (10^{-6})$ UNDER BOTH THE AVERAGE ($5 \times (10^{-10})$) AND PLAUSIBLE MAXIMUM CASE ($2 \times (10^{-7})$). THE HAZARD INDEX FOR EXPOSURE TO NON-CARCINOGENS UNDER BOTH THE AVERAGE AND PLAUSIBLE MAXIMUM CASE IS LESS THAN ONE.

FOR POTENTIAL FUTURE RESIDENTIAL EXPOSURES TO SOILS IN THE NORTHEAST AREA VIA DIRECT CONTACT, THE LIFETIME EXCESS CANCER RISK IS LESS THAN $1 \times (10^{-6})$ ($7 \times (10^{-7})$) FOR THE AVERAGE CASE AND GREATER THAN $1 \times (10^{-6})$ ($6 \times (10^{-5})$) FOR THE PLAUSIBLE MAXIMUM EXPOSURE. THE RISK UNDER THE PLAUSIBLE MAXIMUM CASE IS DUE TO POTENTIAL ARSENIC AND PCB EXPOSURE. AS WITH RISKS ASSOCIATED WITH EXPOSURES TO SOIL IN THE LANDFILL AREA, THE ESTIMATION OF RISKS SHOULD BE VIEWED AS A WORST CASE SCENARIO. DUE TO THE NATURE OF THE CHEMICALS USED IN THE ASSESSMENT AND THE RELATIVELY INFREQUENT DETECTION AT LOW CONCENTRATIONS, IT IS QUESTIONABLE AS TO WHETHER OR NOT THE POTENTIAL RISKS FROM EXPOSURE TO THESE CHEMICALS ARE REPRESENTATIVE OF ACTUAL LANDFILL CONDITIONS.

EXPOSURES TO CHEMICALS EXHIBITING NON-CARCINOGENIC EFFECTS RESULT IN A HAZARD INDEX OF LESS THAN ONE UNDER BOTH THE AVERAGE AND PLAUSIBLE MAXIMUM CASES.

WORKERS: EXPOSURE OF FUTURE CONSTRUCTION WORKERS TO CHEMICALS OF POTENTIAL CONCERN AT THE MUNISPORT LANDFILL WAS NOT ASSESSED QUANTITATIVELY DUE TO THE UNCERTAINTY SURROUNDING THESE POTENTIAL SCENARIOS, PARTICULARLY WITH RESPECT TO THE CHEMICALS AND CONCENTRATIONS TO WHICH WORKERS MIGHT BE EXPOSED. ASSUMING THE REPORTED SOIL CHEMICALS AND CONCENTRATIONS AT THE DEPTHS SAMPLED ARE REPRESENTATIVE OF THE CHEMICALS AND CONCENTRATIONS AT THE DEPTH TO WHICH FUTURE WORKERS WOULD BE EXPOSED, EXPOSURE AND RISKS TO THESE INDIVIDUALS FROM DIRECT CONTACT WITH SOILS ARE LIKELY TO BE LESS THAN THOSE TO FUTURE RESIDENTS BECAUSE EXPOSURE DURATION WOULD BE ONE TO TWO ORDERS OF MAGNITUDE LESS (I.E., 0.5 TO 1 YEAR VERSUS 18 YEARS TO A LIFETIME). HOWEVER, EXPOSURE TO WORKERS IN THE LANDFILL COULD BE GREATER THAN FOR RESIDENTS AND MAY INCLUDE SIGNIFICANT INHALATION EXPOSURES TO VOLATILE CHEMICALS IF WORKERS ARE EXPOSED TO GREATER CONCENTRATIONS OF CHEMICALS WHILE DIGGING IN THE LANDFILL. THESE EXPOSURES AND RISKS CANNOT BE EVALUATED BECAUSE OF LACK OF APPROPRIATE SOIL DATA FROM DEPTHS GREATER THAN 1 FOOT IN THE LANDFILL.

RECREATIONAL USERS: EXPOSURE OF FUTURE RECREATIONAL USERS OF THE MUNISPORT PROPERTY TO SOIL CONTAMINANTS ALSO WAS NOT ASSESSED QUANTITATIVELY. ASSUMING THE REPORTED SOIL CONCENTRATIONS ARE REPRESENTATIVE OF THE CHEMICAL CONCENTRATIONS AT THE DEPTH TO WHICH FUTURE RECREATIONAL USERS WOULD BE EXPOSED, EXPOSURE AND RISKS TO THESE INDIVIDUALS WOULD LIKELY BE LESS THAN THOSE TO FUTURE RESIDENTS BECAUSE EXPOSURE DURATIONS AND FREQUENCIES ARE LIKELY TO BE MUCH LESS.

SUMMARY OF HUMAN HEALTH RISKS

IN SUMMARY, THE ABOVE ANALYSIS INDICATES THAT FOR A POTENTIAL FUTURE SCENARIO FOR A PERSON LIVING FOR A LIFETIME AT THE LANDFILL AND AT THE NORTHEAST AREA OF THE SITE, AND HAVING DIRECT CONTACT WITH SOILS ON A FREQUENT BASIS, MAY EXPERIENCE AN EXCESS LIFETIME CANCER RISK OF $6 \times (10^{-7})$ UNDER THE AVERAGE CASE AND $1 \times (10^{-4})$ UNDER THE PLAUSIBLE MAXIMUM CASE. RISKS TO FUTURE WORKERS AND RECREATIONAL USERS MAY BE LESS. CAUTION SHOULD BE EXERCISED IN INTERPRETING THE ABOVE RISK ESTIMATES. ALTHOUGH IN GENERAL THERE ARE CONSIDERABLE UNCERTAINTIES INHERENT IN RISK ASSESSMENT AND IT IS COMMON TO USE CONSERVATIVE SCENARIOS SUCH AS LIFETIME EXPOSURE (WHICH IS POSSIBLE BUT NOT LIKELY), THERE ARE SEVERAL ASPECTS OF THE ABOVE RISK ESTIMATES, RELATING TO THE CONDITIONS AND ASSUMPTIONS OF EXPOSURE AND THE TOXICITY CRITERIA, THAT ADD AN ADDITIONAL DEGREE OF UNCERTAINTY. THESE ARE OUTLINED BELOW.

UNCERTAINTIES REGARDING EXPOSURE

THE ESTIMATES OF RISK ASSOCIATED WITH SOIL EXPOSURES IN THE FUTURE ARE BASED ON THE ASSUMPTION

THAT THE REPORTED SOIL CONCENTRATIONS DETERMINED FROM A LIMITED NUMBER OF SAMPLES COLLECTED FROM JUST BELOW THE SURFACE OF THE LANDFILL, AND AT APPROXIMATELY TWO FEET IN THE NORTHEAST AREA ARE REPRESENTATIVE OF THE ACTUAL LATERAL EXTENT OF SOIL CONTAMINATION AT THE MUNISPORT LANDFILL, AND ALSO ARE REPRESENTATIVE OF THE CHEMICALS AND CONCENTRATIONS AT THE DEPTH TO WHICH FUTURE USERS OF THE AREA MAY BE EXPOSED AFTER ANY REGRADING. BETWEEN SIX AND EIGHT SOIL SAMPLES WERE COLLECTED FROM EACH OF THREE AREAS OF THE MUNISPORT PROPERTY (LANDFILL, LANDFILL PERIMETER, AND NORTHEAST AREA). THE AREA SAMPLED WAS LARGE (APPROXIMATELY 200 ACRES) AND THEREFORE, THE CHEMICAL CONCENTRATIONS DETERMINED FROM THE SMALL NUMBER OF SAMPLES MAY NOT BE REPRESENTATIVE OF ACTUAL CONCENTRATIONS AT THE SITE. CALCULATION OF EXPOSURE AND RISKS USING THE AVAILABLE SOIL CONCENTRATION DATA MAY OVER- OR UNDERESTIMATE RISK.

THE RISK ESTIMATE FOR SOIL EXPOSURES IN THE LANDFILL COVER UNDER THE PLAUSIBLE MAXIMUM CASE IS DUE PRIMARILY TO POTENTIAL SOIL EXPOSURES TO ARSENIC AND CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS). ARSENIC WAS DETECTED ONLY ONCE IN THE LANDFILL COVER AREA. ASSUMING THE SAMPLING DATA ADEQUATELY DESCRIBE THE LATERAL EXTENT OF SOIL CONTAMINATION AT THE MUNISPORT PROPERTY, ARSENIC IS NOT A PREVALENT CONTAMINANT IN THE LANDFILL COVER AREA. THEREFORE, EXPOSURE TO THE MAXIMUM OR A SIMILARLY HIGH CONCENTRATION FOR A LIFETIME IS NOT LIKELY TO OCCUR, AND THE ESTIMATE OF RISK UNDER THE PLAUSIBLE MAXIMUM CASE REPRESENTS THE EXTREME UPPER BOUND OF POTENTIAL EXPOSURE. WITH RESPECT TO PAHS, ALTHOUGH PAHS WERE AT CONCENTRATIONS THAT WERE ELEVATED ABOVE THE SAMPLE BACKGROUND LEVEL, THESE CONCENTRATIONS WERE WELL WITHIN THE BACKGROUND LEVELS OF TOTAL CARCINOGENIC PAHS TYPICAL OF URBAN AREAS (100-175 MG/KG). PCBS WERE DETECTED IN THE SOIL OF THE NORTHEAST AREA, BUT THESE CONTAMINANTS, LIKE PAHS, ALSO ARE UBIQUITOUS CONTAMINANTS AND ARE GENERALLY INDICATIVE OF URBAN CONTAMINATION.

MANY OF THE UNCERTAINTIES SURROUNDING ESTIMATES OF EXPOSURE AND RISK FROM DIRECT CONTACT WITH SOIL ARE RELATED TO QUESTIONS OF THE ADEQUACY OF THE SOIL SAMPLING DATA TO SUFFICIENTLY CHARACTERIZE THE VERTICAL AND LATERAL EXTENT OF CONTAMINATION AT THE MUNISPORT LANDFILL. THESE UNCERTAINTIES ARE THEMSELVES RELATED TO THE DIFFICULTY INHERENT IN CHARACTERIZING WASTES AT LANDFILLS. FULL CHARACTERIZATION OF WASTES WITHIN A LANDFILL IS NEARLY IMPOSSIBLE BECAUSE OF THE HETEROGENEOUS DISTRIBUTION OF WASTE MATERIALS THROUGHOUT THE LANDFILL, THE VARIETY OF WASTE MATERIALS PRESENT, AND THE PHYSICAL AND CHEMICAL DIVERSITY OF THE CONTAMINANTS WITHIN THE WASTES.

UNCERTAINTIES REGARDING TOXICITY CRITERIA

THERE IS CONSIDERABLE UNCERTAINTY IN THE SCIENTIFIC COMMUNITY REGARDING THE CANCER POTENCY USED TO ESTIMATE RISKS FROM MIXTURES OF CARCINOGENIC PAHS. PAHS OCCUR IN THE ENVIRONMENT AS COMPLEX MIXTURES OF MANY COMPONENTS WITH WIDELY VARYING TOXIC POTENCIES. ONLY A FEW COMPONENTS OF THESE MIXTURES HAVE BEEN CHARACTERIZED ADEQUATELY, AND ONLY LIMITED INFORMATION IS AVAILABLE ON POTENTIAL SYNERGISTIC EFFECTS OF THE PAH MIXTURE. THE APPROACH ADOPTED BY EPA AND USED IN THIS REPORT AS THE BASIS FOR RISK ASSESSMENT IS TO DIVIDE THE PAHS INTO TWO SUBCLASSES, "CARCINOGENIC" PAHS AND "NON-CARCINOGENIC" PAHS, AND TO APPLY A CANCER POTENCY FACTOR DERIVED FROM ORAL BIOASSAYS ON BENZO(A)PYRENE TO THE SUBCLASS OF CARCINOGENIC PAHS. MOST EVIDENCE INDICATES THAT BENZO(A)PYRENE IS MORE POTENT THAN MOST OF THE OTHER CARCINOGENIC PAHS AND A MIXTURE OF CARCINOGENIC PAHS; THEREFORE, THIS TECHNIQUE PROBABLY OVERESTIMATES RISK FROM THE CARCINOGENIC PAHS. HOWEVER, THIS OVERESTIMATION IS OFFSET BY THE FACT THAT NOT ALL CARCINOGENIC PAHS ARE INCLUDED IN THE TARGET COMPOUND LIST AND THEREFORE WERE NOT ANALYZED.

IN CONCLUSION, UNDER CURRENT SITE CONDITIONS, THE SITE DOES NOT POSE A SIGNIFICANT THREAT TO PUBLIC HEALTH OR WELFARE. UNDER FUTURE USE CONDITIONS, RESIDENTS LIVING ON OR ADJACENT TO THE NORTHEAST SECTION OF THE LANDFILL MAY EXPERIENCE SOMEWHAT GREATER, BUT STILL MINIMAL RISKS. FUTURE WORKERS OR RECREATIONAL USERS OF THE LANDFILL AREA ARE NOT EXPECTED TO EXPERIENCE ANY SIGNIFICANT INCREASE IN RISK DUE TO THEIR RELATIVELY SHORTER PERIOD OF EXPOSURE IN COMPARISON TO RESIDENTS. ADDITIONALLY, FUTURE RISKS WERE BASED ON THE ABSENCE OF ANY LAND USE RESTRICTION OR

INSTITUTIONAL CONTROLS. ALTHOUGH IT IS NOT KNOWN FOR CERTAIN AT THIS TIME, FUTURE LAND USE RESTRICTIONS OR INSTITUTIONAL CONTROLS MAY BE IMPOSED BY STATE OR LOCAL AGENCIES THAT WILL FURTHER REDUCE FUTURE RISKS.

ENVIRONMENTAL RISKS

POTENTIAL ENVIRONMENTAL IMPACTS OF THE CHEMICALS OF POTENTIAL CONCERN AT THE MUNISPORT PROPERTY WERE ALSO EVALUATED. THIS ASSESSMENT WAS INITIALLY BASED UPON DATA COLLECTED DURING THE 1988 EPA RI, DATA OBTAINED FROM THE LITERATURE, AND A COOPERATIVE STUDY OF THE MUNISPORT AREA CONDUCTED BY THE EPA AND THE FWS. THE RESULTS OF THE INITIAL ASSESSMENT WERE INCONCLUSIVE AND, AS A RESULT, A SUBSEQUENT STUDY WAS CONDUCTED BY EPA IN 1989 TO FURTHER DEFINE THE THREAT TO THE ENVIRONMENT. THE GENERAL APPROACHES AND CONCLUSIONS OF THIS ENVIRONMENTAL ASSESSMENT ARE PRESENTED BELOW.

RECEPTOR CHARACTERIZATION

INITIAL ASSESSMENT

IN THIS ASSESSMENT, THE ENVIRONMENTAL RECEPTORS POTENTIALLY AFFECTED BY THE CHEMICALS ASSOCIATED WITH THE MUNISPORT LANDFILL WERE IDENTIFIED. IN GENERAL, IT IS NOT CONSIDERED FEASIBLE TO ASSESS IMPACTS TO ALL RECEPTORS ASSOCIATED WITH CERCLA SITES, AS IN THE CASE OF THE MUNISPORT LANDFILL SITE. RATHER, EPA SELECTS REPRESENTATIVE HABITATS OR REPRESENTATIVE SPECIES FROM THESE HABITATS AS INDICATORS OF POTENTIAL IMPACTS. FOR THE AQUATIC SYSTEMS, THE MANGROVE AREAS AND THE OLETA RIVER AND OTHER TRIBUTARIES TO BISCAYNE BAY WERE SELECTED AS REPRESENTATIVE HABITATS FOR SALTWATER SPECIES. THE ONSITE LAKES WERE SELECTED AS REPRESENTATIVE HABITATS FOR FRESHWATER SPECIES. RESIDENT BIRDS OF THE MANGROVE AREAS AND RESIDENT MAMMALS OF THE UPLAND AREAS ADJACENT TO THE LANDFILL WERE SELECTED AS RECEPTORS FOR TERRESTRIAL SYSTEMS. A FIFTH CATEGORY OF POTENTIAL RECEPTOR WAS THE ENDANGERED AND THREATENED SPECIES OF THE MUNISPORT AREA.

SUBSEQUENT ASSESSMENT

RESULTS FROM THE INITIAL ASSESSMENT INDICATED THAT THE ECOLOGICAL COMMUNITY ASSOCIATED WITH THE STATE MANGROVE PRESERVE SOUTHEAST OF THE LANDFILL MAY BE ADVERSELY AFFECTED BY CONTAMINANTS MIGRATING FROM THE LANDFILL. THE MANGROVE PRESERVE NOT ONLY SUPPORTS ONE OF THE LAST NATIVE STANDS OF PREDOMINANTLY RED AND BLACK MANGROVES IN BISCAYNE BAY, BUT ALSO AN AQUATIC COMMUNITY THAT PLAYS AN PARAMOUNT ROLE IN THE SUPPORT OF THE BAY ECOSYSTEM.

WETLAND SYSTEMS SUCH AS THESE PERFORM NUMEROUS FUNCTIONS SUCH AS FISH AND WILDLIFE HABITAT, WATER QUALITY IMPROVEMENT, FLOOD PROTECTION, SHORELINE EROSION CONTROL, AND RECREATION AND AESTHETICS. WITH REGARD TO THIS SYSTEM, ONE OF THE MORE IMPORTANT FUNCTIONS IS THE SUPPORT IT PROVIDES IN TERMS OF FOOD FOR THE MARINE FOOD CHAIN AND HABITAT FOR NUMEROUS LARVAL AND JUVENILE FISH SPECIES INDIGENOUS TO BISCAYNE BAY AND THE ATLANTIC OCEAN. AS VEGETATION (E.G., LEAVES AND STEMS) FROM THE MANGROVES DIES AND FALLS INTO THE WATER, IT DECOMPOSES INTO SMALL PARTICLES OF ORGANIC MATERIAL KNOWN AS DETRITUS. THIS NUTRIENT-ENRICHED MATERIAL SERVES AS THE PRIMARY FOOD FOR MANY OF THE SMALL AQUATIC INVERTEBRATES, SHELLFISH, AND FISH THAT SERVE AS FOOD FOR LARGER PREDATORY FISH. MANY OF THESE SHELLFISH AND LARGER PREDATORY FISH ARE THEN HARVESTED, EITHER RECREATIONALLY OR COMMERCIALY, FOR HUMAN CONSUMPTION. WITH REGARD TO HABITAT, THE MANGROVES PROVIDE HABITAT FOR MANY DIFFERENT SPECIES OF SHELLFISH AND FISH INDIGENOUS TO BISCAYNE BAY AND THE ATLANTIC OCEAN. TYPICALLY, THE LARVAL AND JUVENILE STAGES OF MANY LARGER FISH SPECIES HARVESTED, EITHER RECREATIONALLY OR COMMERCIALY FROM BISCAYNE BAY OR THE ATLANTIC OCEAN, REQUIRE HABITATS SUCH AS THE MANGROVE AREA DURING THE INITIAL PHASE OF THEIR LIFE CYCLE. WITHOUT HABITATS SUCH AS THESE MANGROVE COMMUNITIES, THE RECREATIONAL AND COMMERCIAL VALUE OF MANY OF THESE FISH SPECIES IS SEVERELY IMPAIRED.

FINALLY, AS MORE WETLAND AREAS ARE LOST, THE FOR SURVIVAL PRESSURE ON THE FEW REMAINING ORGANISMS INCREASES SIGNIFICANTLY.

EXPOSURE ASSESSMENT

INITIAL ASSESSMENT

EXPOSURE TO AQUATIC LIFE IN THE SURFACE WATER ON AND NEAR THE MUNISPORT PROPERTY WAS INITIALLY ASSESSED USING THE MEAN AND MAXIMUM CONCENTRATIONS OF THE CHEMICALS OF POTENTIAL CONCERN IN SURFACE WATER. EXPOSURE TO CHEMICALS OF POTENTIAL CONCERN IN FISH WAS ESTIMATED USING DATA ON CONTAMINANTS PRESENT IN FISH COLLECTED FROM THE SOUTH AND EAST AREAS, AS REPORTED BY THE FWS AND EPA. EXPOSURE IN BIRDS WAS ESTIMATED USING THE GREAT BLUE HERON AS A REPRESENTATIVE RECEPTOR. IT WAS ASSUMED THAT A HERON OBTAINED 50 PERCENT OF ITS DAILY FOOD INTAKE FROM THE SOUTH AND EAST AREA. DAILY EXPOSURE INTAKES OF CHEMICALS IN FISH COLLECTED FROM THE MANGROVE AREAS WERE AVERAGED OVER THE ENTIRE DIET. EXPOSURE TO MAMMALS IN THE UPLAND AREAS OF THE MUNISPORT LANDFILL SITE WAS ASSESSED ASSUMING THAT A MAMMAL MAY DRINK FROM THE ONSITE LAKES AND CONSUME DAILY AN AMOUNT OF WATER EQUIVALENT TO 1 PERCENT OF ITS BODY WEIGHT. EXPOSURE TO THE ENDANGERED AND THREATENED SPECIES OF THE AREA WAS QUALITATIVELY DISCUSSED. NO OTHER EXPOSURE PATHWAYS WERE ASSESSED FOR AQUATIC LIFE, BIRDS, MAMMALS, OR OTHER WILDLIFE BECAUSE, IN MOST CASES, ADEQUATE DATA TO QUANTIFY EXPOSURE OR TOXICITY WERE NOT AVAILABLE.

SUBSEQUENT ASSESSMENT

AS A PART OF THE SUBSEQUENT STUDY CONDUCTED BY EPA IN JUNE 1989, THE POTENTIAL FOR EXPOSURE OF VARIOUS AQUATIC ORGANISMS TO CONTAMINANTS MIGRATING FROM THE LANDFILL WAS ASSESSED. IT WAS DETERMINED THAT LEACHATE-CONTAMINATED GROUNDWATER WAS EMERGING IN THE SURFACE WATERS OF THE MANGROVE PRESERVE. MOREOVER, TIDAL STAGE WAS DETERMINED TO SIGNIFICANTLY AFFECT THE EMERGENCE OF LEACHATE IN THE PRESERVE. WITH EACH RECEDING OF THE TIDE, THE UPWELLING OF LEACHATE-CONTAMINATED GROUNDWATER INCREASED TO LEVELS THAT WERE SEVERELY TOXIC TO AQUATIC LIFE. AQUATIC LIFE POTENTIALLY AFFECTED BY THIS LEACHATE INCLUDES THE EGGS, LARVAL, AND JUVENILE STAGES OF SHELLFISH AND FISH THAT MIGRATE INTO THE PRESERVE.

ENVIRONMENTAL RISK ASSESSMENT

INITIAL ASSESSMENT

THE AVAILABLE TOXICITY DATA FOR THE CHEMICALS OF POTENTIAL CONCERN FOR WHICH EXPOSURE WAS INITIALLY ASSESSED WERE REVIEWED TO IDENTIFY TOXICITY VALUES POTENTIALLY USEFUL IN ESTIMATING RISKS TO RECEPTORS. RISKS TO AQUATIC LIFE WERE ASSESSED BY COMPARING THE SURFACE WATER CONCENTRATIONS TO THE STATE OF FLORIDA OR DADE COUNTY CRITERIA ESTABLISHED FOR CLASS III SURFACE WATER OR AMBIENT WATER QUALITY CRITERIA DEVELOPED BY EPA. RISKS TO BIRDS INGESTING CONTAMINANTS IN FISH WERE ESTIMATED ONLY FOR SURFACE WATER CONTAMINANTS INCLUDING ARSENIC, CHROMIUM, 4,4'-DDE, MERCURY, AND NICKEL, SINCE ADEQUATE TOXICITY DATA EXIST ONLY FOR THESE CHEMICALS. ESTIMATED DIETARY CONCENTRATIONS WERE COMPARED TO THE SELECTED TOXICITY VALUE. RISKS TO MAMMALS WERE ESTIMATED ONLY FOR CYANIDE, MANGANESE, PHENOL, AND VANADIUM BECAUSE TOXICITY DATA WERE ONLY AVAILABLE FOR THESE CHEMICALS. AGAIN, RISKS WERE ESTIMATED BY COMPARING THE ESTIMATED DOSAGES FROM DRINKING WATER WITH THE SELECTED TOXICITY VALUE.

ABSOLUTE CONCLUSIONS REGARDING THE POTENTIAL ENVIRONMENTAL IMPACTS OF CERCLA SITES OFTEN CANNOT BE MADE. IN THE CASE OF THE MUNISPORT LANDFILL AREAS, IT IS DIFFICULT TO DETERMINE IF THE CHEMICALS AND CONCENTRATIONS OBSERVED ARE DIRECTLY RELATED TO THE LANDFILL DUE TO THE NATURE OF THE DISPOSAL ACTIVITIES OCCURRING AT THIS SITE. ALSO, THERE ARE ADDITIONAL SIGNIFICANT UNCERTAINTIES SURROUNDING ESTIMATES OF EXPOSURE AND TOXICITY. HENCE, UPPER BOUNDS ARE ESTABLISHED WHICH INCORPORATED A MARGIN OF SAFETY IN ORDER TO BE PROTECTIVE OF TOXICOLOGICALLY

SENSITIVE SPECIES OR WEAKER INDIVIDUALS OF A PARTICULAR SPECIES.

GIVEN THE AVAILABLE DATA AND LIMITATIONS, SEVERAL GENERAL CONCLUSIONS ABOUT THE POTENTIAL FOR ENDANGERMENT OF FISH AND WILDLIFE IN THE MUNISPORT AREA WERE INITIALLY MADE.

- 1) THE CONCENTRATIONS OF CHEMICALS IN THE SURFACE WATER AT THE MUNISPORT PROPERTY EXCEEDED THE ACUTE AND/OR CHRONIC AWQC OR THE FDER OR DADE COUNTY CRITERION FOR SEVERAL CHEMICALS. BASED ON THE POTENTIAL FOR TOXIC EFFECTS TO OCCUR IN THESE WATERS, EPA CONDUCTED ACUTE TOXICITY TESTS WITH WATER COLLECTED FROM EAST LAKE. THESE TESTS RESULTED IN SIGNIFICANT MORTALITY IN FISH AND INVERTEBRATES. CHRONIC TOXICITY TESTS CONDUCTED WITH SAMPLES COLLECTED FROM NORTHEAST LAKE AND THE HYDROLOGICALLY ALTERED WETLANDS DEMONSTRATED TOXIC EFFECTS ON SEA URCHINS AND MACROALGAE. ALTHOUGH CONTAMINANTS IN THESE LAKES ARE AT LEVELS THAT ARE TOXIC TO VARIOUS AQUATIC LIFE, THESE LAKES OR BORROW PITS WERE CREATED AS A RESULT OF FORMER LANDFILL ACTIVITIES. TYPICALLY, SOIL WAS EXCAVATED FROM DEPTHS AS GREAT AS 30 FEET BELOW LAND SURFACE FOR COVER MATERIAL. THE GROUNDWATER THEN FILLED THESE EXCAVATIONS, CREATING THE LAKES. AS A RESULT, THE DEPTH OF THE LAKES, THE SEPARATION FROM NATURAL WATER BODIES, AND THE PHYSICOCHEMICAL PROPERTIES OF THE WATER PRECLUDE THE DEVELOPMENT AND MAINTENANCE OF A BENEFICIAL AQUATIC COMMUNITY. THEREFORE, IN THE ABSENCE OF AN AQUATIC COMMUNITY, THE PRESENCE OF NORMALLY TOXIC LEVELS OF CHEMICALS IN THE LAKES DOES NOT REPRESENT A THREAT TO THE ENVIRONMENT ASSOCIATED WITH THESE MAN-MADE LAKES ON THE MUNISPORT PROPERTY.
- 2) THE PREDICTED CONCENTRATIONS OF CHEMICALS IN THE DIET OF BIRDS FEEDING ON FISH FROM THE MANGROVE SWAMP ADJACENT TO THE MUNISPORT LANDFILL ARE ONE TO THREE ORDERS OF MAGNITUDE BELOW THE LEVELS KNOWN TO CAUSE TOXIC RESPONSES IN OTHER BIRD SPECIES, AND ADVERSE EFFECTS RESULTING FROM INTAKES OF THESE CHEMICALS VIA THE ANIMAL DIET ARE NOT LIKELY. EXPOSURE VIA OTHER FOOD ITEMS, WATER, AIR, AND THROUGH THE SKIN, WILL PROBABLY NOT RESULT IN ANY ADVERSE EFFECTS. RISKS WERE ESTIMATED ONLY FOR EXPOSURES TO A SUBSET OF CHEMICALS MEASURED IN FISH BECAUSE ADEQUATE TOXICITY DATA WERE AVAILABLE ONLY FOR THESE CHEMICALS. OTHER CHEMICALS IN THE SWAMP, HOWEVER, MAY CONTRIBUTE TO OVERALL RISK; THE MAGNITUDE OF THIS CONTRIBUTION COULD NOT BE ESTIMATED.
- 3) THE CONCENTRATIONS OF CYANIDE, MANGANESE, PHENOL, AND VANADIUM IN THE ONSITE LAKES (FORMER BORROW PITS) SHOULD NOT BE TOXIC TO MAMMALS THAT MAY INGEST THE LAKE WATER. THE ESTIMATED DOSAGES FOR MAMMALS FOR EACH CHEMICAL ARE WELL BELOW (FIVE TO SIX ORDERS OF MAGNITUDE) THE SELECTED CRITICAL TOXICITY VALUE. HOWEVER, LAKES OR EXPOSURES VIA DIFFERENT PATHWAYS MAY INCREASE RISKS TO MAMMALS THAT MAY FREQUENT THE MUNISPORT PROPERTY.

SUBSEQUENT ASSESSMENT

THE RESULTS FROM THE EPA WATER QUALITY AND TOXIC ASSESSMENT STUDY SERVED TO QUANTITATIVELY AND QUALITATIVELY ASSESS RISKS TO AQUATIC ORGANISMS IN THE MANGROVE PRESERVE. THE STUDY DEMONSTRATED THAT AS A RESULT OF THE EMERGENCE OF LEACHATE-CONTAMINATED GROUNDWATER IN THE PRESERVE, AQUATIC LIFE WAS SEVERELY IMPACTED. BOTH CHRONIC AND ACUTE TOXICITY TESTS WERE USED TO MEASURE THE EFFECTS OF THE LEACHATE ON AQUATIC LIFE. THE RESULTS OF THESE TESTS INDICATED SIGNIFICANT ADVERSE EFFECTS IN THREE OF THE FOUR TEST SPECIES. THE MOST SEVERE EFFECTS WERE OBSERVED USING SURFACE WATER SAMPLES COLLECTED AT LOW TIDE. TYPICALLY, THERE WAS NO SURVIVAL AMONG THE TEST ORGANISMS EXPOSED TO WATER SAMPLES COLLECTED FROM THE BACKWATER PORTION OF THE PRESERVE IN COMPARISON TO APPROXIMATELY 70 PERCENT SURVIVAL AMONG TEST ORGANISMS EXPOSED TO WATER SAMPLES COLLECTED FROM BACKGROUND LOCATIONS IN BISCAYNE BAY.

ENVIRONMENTAL RISKS SUMMARY

ALTHOUGH THE INITIAL ENVIRONMENTAL ASSESSMENT DID NOT CONCLUSIVELY DEMONSTRATE THAT THE MUNISPORT LANDFILL WAS A THREAT TO THE ENVIRONMENT, IT IDENTIFIED SEVERAL POTENTIAL THREATS TO

THE ENVIRONMENT. ONE SUCH POTENTIAL THREAT WAS TO THE AQUATIC LIFE IN THE MANGROVE PRESERVE. ADDITIONAL STUDY BY EPA OF AQUATIC LIFE IN THE PRESERVE CONCLUSIVELY DEMONSTRATED THAT LEACHATE-CONTAMINATED GROUNDWATER FROM THE LANDFILL WAS EMERGING IN THE PRESERVE AT A CONCENTRATION TOXIC TO AQUATIC LIFE. THE RESULTS FURTHER MEASURED THE TOXIC EFFECTS OF THE CONTAMINANTS ON THE AQUATIC LIFE. THE STUDY CONCLUDED THAT, UNLESS ABATED, THE LEACHATE WILL CONTINUE TO "SEVERELY IMPAIR THE ECOLOGICAL FUNCTIONS OF THE PRESERVE AND PRECLUDE THE DEVELOPMENT AND MAINTENANCE OF A BALANCED COMMUNITY OF AQUATIC BIOTA".

DESCRIPTION OF ALTERNATIVES

ON THE BASIS OF PAST STUDIES, INCLUDING THE 1988 EPA RI/FS AND THE 1989 EPA WATER QUALITY AND TOXIC ASSESSMENT STUDY, IT HAS BEEN DETERMINED THAT THE MUNISPORT PROPERTY PRESENTS A SIGNIFICANT THREAT TO THE ENVIRONMENT. THE STUDIES ALSO ESTABLISHED THAT THE MUNISPORT LANDFILL REPRESENTS NO CURRENT OR FORESEEABLE THREAT TO HUMAN HEALTH OR WELFARE. HOWEVER, UNDER STATE CLOSURE, COVER OF THE LANDFILL MAY BE NECESSARY TO REDUCE THE LIKELIHOOD OF FIRES, ODORS, AND/OR SAFETY HAZARDS.

THE ENVIRONMENTAL THREAT IS THE RESULT OF LEACHATE MIGRATING FROM THE MUNISPORT LANDFILL INTO THE GROUNDWATER AND SUBSEQUENTLY MIGRATING TO AND SURFACING IN THE MANGROVE PRESERVE SOUTHEAST OF THE SITE. CONSEQUENTLY, EPA HAS DEVELOPED A SET OF REMEDIAL ACTION ALTERNATIVES SPECIFICALLY DESIGNED TO ABATE THE THREAT TO THE AQUATIC ORGANISMS IN THE STATE MANGROVE PRESERVE.

THE OBJECTIVE OF EACH OF THESE REMEDIAL ACTION ALTERNATIVES IS TO INTERCEPT THE LEACHATE-CONTAMINATED GROUNDWATER PRIOR TO ITS EMERGENCE IN THE PRESERVE, COLLECT THE LEACHATE-CONTAMINATED GROUNDWATER, TREAT THE CONTAMINATED GROUNDWATER TO RENDER IT NON-TOXIC, AND THEN RETURN THE TREATED EFFLUENT TO THE ENVIRONMENT. AS PRESENTLY DESIGNED, EACH OF THE REMEDIAL ACTION ALTERNATIVES WILL ACCOMPLISH THIS OBJECTIVE AND ULTIMATELY BE PROTECTIVE OF THE ENVIRONMENT. THE DIFFERENCES ASSOCIATED WITH THESE ALTERNATIVES CENTER PRIMARILY AROUND ARARS, IMPLEMENTABILITY, AND COSTS. THESE FACTORS ARE DISCUSSED IN DETAIL IN THE COMPARATIVE ANALYSIS SECTION OF THIS DOCUMENT. TO PROVIDE THE READER WITH AN ADEQUATE UNDERSTANDING OF THE REMEDIAL ACTION ALTERNATIVES AND TO ALLOW AN ADEQUATE COMPARATIVE ANALYSIS OF THE ALTERNATIVES, THIS SECTION OF THE ROD HAS BEEN DIVIDED INTO SEVERAL SUBSECTIONS. THESE SUBSECTIONS ADDRESS COMMON ELEMENTS AMONG ALTERNATIVES, SCOPE OF ALTERNATIVES, ARARS, AND CLEANUP CRITERIA.

COMMON ELEMENTS

AN ELEMENT COMMON TO ALL OF THE REMEDIAL ACTION ALTERNATIVES ARE HYDROLOGIC IMPROVEMENTS TO THE HYDROLOGICALLY ALTERED WETLAND AREAS AND THE MANGROVE PRESERVE. THE OBJECTIVE OF THESE IMPROVEMENTS IS THE RESTORATION OF THE FULL TIDAL CONNECTION BETWEEN THE MANGROVE PRESERVE AND BISCAYNE BAY. BREACHES WILL ALSO BE MADE IN THE DIKE SEPARATING THE ALTERED WETLANDS AND THE MANGROVE PRESERVE. THESE BREACHES WILL SERVE TO RESTORE THE TIDAL CONNECTION BETWEEN THE ALTERED WETLANDS WITH THE PRESERVE AND BAY.

A SECOND ELEMENT COMMON TO ALL OF THE ALTERNATIVES IS THE CLOSURE OF THE LANDFILL PROPER UNDER STATE AUTHORITY. ALTHOUGH THE LANDFILL CLOSURE WILL BE CONDUCTED CONCURRENTLY WITH THE CERCLA REMEDIAL ACTION, THE CLOSURE WILL BE CONDUCTED UNDER THE AUTHORITY OF THE STATE SINCE THE LANDFILL HAS NOT BEEN SHOWN TO PRESENT A SIGNIFICANT THREAT TO EITHER HUMAN HEALTH OR WELFARE OR TO CONTAIN A DISCRETE SOURCE OF CONTAMINATION. THUS, EPA HAS DETERMINED THAT ACTION IS NOT NECESSARY UNDER CERCLA TO CLOSE THE LANDFILL; INDEED, SUCH ACTION WOULD BE DUPLICATIVE OF THE ONGOING STATE ACTION. AT THE SAME TIME, EPA BELIEVES THAT CLOSURE OF THE LANDFILL IS APPROPRIATE IN ORDER TO REDUCE THE POTENTIAL FOR FUTURE FIRES, REDUCE ODORS, AND MINIMIZE SAFETY HAZARDS. THUS, ALTHOUGH FDER WILL DIRECT THIS CLOSURE, EPA WILL CONSULT WITH FDER TO ENSURE THAT THE LANDFILL CLOSURE AND SUPERFUND RESPONSE ACTION ARE COMPATIBLE. IN THE EVENT, HOWEVER, THAT ADDITIONAL DATA COLLECTED PRIOR TO OR DURING THE REMEDIAL DESIGN INDICATES THAT A LARGER PORTION

OF THE LANDFILL IS NEEDED TO IMPLEMENT THE CERCLA RESPONSE ACTION, EPA WILL RETAIN JURISDICTION OVER THIS LARGER PORTION OF THE LANDFILL (54 FR 41002-3 (OCTOBER 4, 1989 (FR EXCERPT CONTAINED IN APPENDIX A))). FINALLY, WITHIN FIVE YEARS OF THE COMPLETION OF THE CERCLA REMEDIAL AND STATE LANDFILL CLOSURE ACTIONS, EPA WILL REVIEW THE ENTIRE RESPONSE TO ENSURE THAT THE THREAT TO THE ENVIRONMENT HAS BEEN ELIMINATED, AS REQUIRED IN CERCLA, SECTION 121(C). IF THE LANDFILL HAS NOT BEEN PROPERLY CLOSED BY THAT TIME, EPA WILL CONSIDER FURTHER ACTION UNDER CERCLA, IF THE SITUATION SO WARRANTS.

SINCE EACH OF THE REMEDIAL ALTERNATIVES WILL INCLUDE ACTIONS TAKEN UNDER CERCLA AND STATE AUTHORITY, AN ATTEMPT WILL BE MADE IN THE DISCUSSION OF THE ALTERNATIVES TO IDENTIFY WHICH PORTIONS OF THE LANDFILL, MANGROVE PRESERVE, AND HYDROLOGICALLY ALTERED WETLANDS WILL BE INCLUDED IN THE SUPERFUND RESPONSE ACTION. CONSISTENT WITH THE DEFINITION OF "ON-SITE" IN THE NATIONAL CONTINGENCY PLAN (NCP), THE AMOUNT OF LAND INCLUDED IN THE CERCLA RESPONSE ACTION WILL INCLUDE THE EXTENT OF THE RELEASE OF HAZARDOUS SUBSTANCES INTO THE MANGROVE PRESERVE AND THAT AREA ON THE LANDFILL PROPER NEEDED FOR THE CONSTRUCTION OF THE VARIOUS COMPONENTS TO EFFECT THE RESPONSE ACTION (40 CFR 300.400(E)). ASIDE FROM THE AREA OF THE MANGROVE PRESERVE, THE ESTIMATED AMOUNT OF LAND ON THE LANDFILL PROPER REQUIRED FOR THE CERCLA REMEDIAL ACTION IS APPROXIMATELY 30 ACRES. OF COURSE, SHOULD IT BE DETERMINED AS A RESULT OF THE HYDROLOGIC STUDY THAT MORE AREA IS NEEDED TO IMPLEMENT THE CERCLA REMEDY, THE AREA OF CERCLA RESPONSE WILL BE EXPANDED AS APPROPRIATE. THIS ROD DOES NOT REQUIRE ACTION UNDER CERCLA FOR THE REMAINING 140 ACRES OF THE LANDFILL AT THIS TIME. (THE SIGNIFICANCE OF EPA'S DECISION TO ADDRESS ONLY PART OF A LARGER SITE IS DISCUSSED AT 54 FR 41002-3 (OCTOBER 4, 1989 (FR EXCERPT CONTAINED IN APPENDIX A))).

EACH OF THE ALTERNATIVES WAS DEVELOPED AS PART OF THE 1990 FS ADDENDUM TO IDENTIFY AND EVALUATE REMEDIAL ACTION ALTERNATIVES NEEDED TO RESPOND TO THE ENVIRONMENTAL THREAT. AN INITIAL SET OF ALTERNATIVES WAS FIRST DEVELOPED BY A TECHNICAL ADVISORY COMMITTEE (TAC). THIS TAC WAS ORGANIZED TO ASSIST EPA AND FDER IN DEVELOPING CRITERIA FOR THE CERCLA REMEDIAL ACTION AND STATE LANDFILL CLOSURE, RESPECTIVELY. THE APPLICABILITY AND SUCCESSFULNESS OF THE TREATMENT METHODS SPECIFIED IN THE REMEDIAL ALTERNATIVES WERE EVALUATED ON THE BASIS OF DATA COLLECTED FROM SIMILAR APPLICATIONS IN INDUSTRY OR REMEDIAL ACTIONS IN WHICH THE SAME TREATMENT METHOD SPECIFIED IN THE REMEDIAL ALTERNATIVE WAS USED.

THE TREATMENT SYSTEMS CONSIDERED COULD NOT BE EVALUATED USING SITE-SPECIFIC DATA, SITE-SPECIFIC HYDROLOGIC STUDIES, TREATABILITY STUDIES, OR PILOT TESTS DUE TO THE LACK OF THIS INFORMATION. THEREFORE, A SITE-SPECIFIC HYDROLOGIC STUDY WILL BE CONDUCTED DURING REMEDIAL DESIGN FOR ALL OF THE ALTERNATIVES (EXCEPT "NO ACTION") TO DEVELOP INFORMATION NECESSARY TO PROPERLY DESIGN THE REMEDY. EPA WILL CONSULT WITH THE TAC ON THE PLANNING AND REVIEW OF THE RESULTS OF THE HYDROLOGIC, WATER QUALITY, AND OTHER STUDIES AS APPROPRIATE.

THESE STUDIES WILL BE CONDUCTED TO ENSURE THAT THE SELECTED REMEDY IS APPROPRIATE IN VIEW OF LOCAL HYDROLOGIC CONDITIONS AND THAT THE TREATMENT SYSTEM SUCCESSFULLY REMOVES THE TOXICITY FROM THE CONTAMINATED GROUNDWATER. ONLY AFTER THESE STUDIES DEMONSTRATE THE EXPECTED PERFORMANCE WILL THE RESPONSE ACTION PROCEED.

IF DATA COLLECTED FROM THE HYDROLOGIC STUDY, TREATABILITY STUDY, AND/OR PILOT TESTS DEMONSTRATE THAT THE SELECTED REMEDIAL ACTION NEEDS TO BE MODIFIED, THE NECESSARY MODIFICATIONS WILL BE MADE. THE MODIFICATIONS MAY INCLUDE CHANGES TO THE SELECTED REMEDY OR, IF NECESSARY, THE SELECTION OF A DIFFERENT REMEDY. EPA WILL CONSULT WITH THE APPROPRIATE FEDERAL, STATE, LOCAL GOVERNMENTS, AND THE TAC BEFORE MAKING SIGNIFICANT MODIFICATIONS. THE PUBLIC WILL BE NOTIFIED OF ANY SIGNIFICANT CHANGES IN THE PERFORMANCE OR COST OF THE REMEDY.

#SA

SCOPE OF ALTERNATIVES

THE FOLLOWING SECTIONS REVIEW EACH OF THE ALTERNATIVES IN TERMS OF THE SCOPE OF THE REMEDIAL ACTION, TREATMENT TECHNOLOGIES, AND CLEANUP GOALS.

ALTERNATIVE 1 (NO ACTION)

CERCLA REQUIRES THAT A "NO ACTION" ALTERNATIVE BE EVALUATED AT EVERY SITE TO ESTABLISH A BASELINE FOR COMPARISON. THIS ALTERNATIVE WOULD INCLUDE ANNUAL MONITORING OF THE SITE BUT NO FURTHER REMEDIAL ACTION UNDER CERCLA. ALTHOUGH THE LANDFILL WOULD BE CLOSED UNDER STATE AUTHORITY, MUCH OF THE WASTE BELOW THE WATER TABLE WOULD BE EXPECTED TO GENERATE AND RELEASE LEACHATE WHICH WOULD CONTINUE TO ADVERSELY AFFECT THE AQUATIC LIFE OF THE MANGROVE PRESERVE.

THE TOTAL PRESENT WORTH COST OF THIS ALTERNATIVE INCLUDING OPERATION AND MAINTENANCE IS ESTIMATED AT \$366,000. THE AMOUNT OF TIME NEEDED IMPLEMENT THE MONITORING SYSTEM IS ESTIMATED AT SIX MONTHS.

ALTERNATIVE 2 (GROUNDWATER RECOVERY/MECHANICAL AND BIOLOGICAL TREATMENT)

THE SCOPE OF THIS REMEDIAL ACTION ALTERNATIVE INCLUDES THE INTERCEPTION AND COLLECTION OF LEACHATE-CONTAMINATED GROUNDWATER USING A SERIES OF RECOVERY WELLS. CONTAMINATED GROUNDWATER WOULD BE TREATED USING A MECHANICAL PRE-TREATMENT SYSTEM FOLLOWED BY BIOLOGICAL TREATMENT IN A CONSTRUCTED WETLANDS TREATMENT SYSTEM TO COMPLETE THE REMOVAL OF THE TOXICITY FROM THE CONTAMINATED GROUNDWATER. THE NON-TOXIC TREATED EFFLUENT WOULD THEN BE DISCHARGED TO THE STATE MANGROVE PRESERVE. THE TREATED EFFLUENT WOULD ALSO BE PERIODICALLY MONITORED TO ENSURE THAT APPLICABLE WATER QUALITY STANDARDS WERE MET PRIOR TO DISCHARGE.

LEACHATE MIGRATING FROM THE LANDFILL TOWARD THE SOUTHEAST TO THE MANGROVE PRESERVE WOULD BE INTERCEPTED BY AN ARRAY OF RECOVERY WELLS CONSTRUCTED ALONG THE LANDFILL SIDE OF THE MANGROVE PRESERVE DIKE. A TOTAL OF 17 WELLS WERE ESTIMATED AS NECESSARY TO EFFECTIVELY CAPTURE BOTH THE VERTICAL AND LATERAL EXTENT OF THE CONTAMINANT PLUME PROJECTED IN THE EPA RI. THE PROJECTED LATERAL EXTENT OF THE PLUME AS MODELED USING AMMONIA AS THE INDICATOR CHEMICAL IS SHOWN IN FIGURE 6. FIGURE 7 SHOWS THE TENTATIVE POSITIONING OF THE WELLS AS PROJECTED USING CONTAMINANT FATE AND TRANSPORT MODELING COMPUTER PROGRAMS. IT IS LIKELY THAT THE WELLS WOULD HAVE TOTAL DEPTHS OF APPROXIMATELY 40 FEET BELOW LAND SURFACE (BLS) AND BE ESSENTIALLY SCREENED THROUGHOUT THE ENTIRE DEPTH TO ENSURE THAT THE LEACHATE IS ADEQUATELY INTERCEPTED. IN ORDER TO INTERCEPT THE LEACHATE, THE WELLS ARE EXPECTED TO WITHDRAW AN ESTIMATED 1.2 MILLION GALLONS PER DAY (MGD) OF GROUNDWATER. IT SHOULD BE NOTED, HOWEVER, THAT THE EXACT NUMBER, POSITION, DEPTH, SCREEN INTERVAL, AND PUMPING RATE OF THE WELLS WOULD BE DEFINED ON THE BASIS OF THE DATA COLLECTED FROM THE SITE-SPECIFIC HYDROLOGIC STUDY. THIS COULD RESULT IN AN INCREASE OR DECREASE IN THE NUMBER OR DEPTH OF THE WELLS, AND IN THE AMOUNT OF EXTRACTED GROUNDWATER THAT WOULD REQUIRE TREATMENT AND DISPOSAL.

TREATMENT WOULD INCLUDE BOTH MECHANICAL AND BIOLOGICAL TREATMENT PROCESSES. SINCE THE LEACHATE TOXICITY SEEMS TO BE PRIMARILY RELATED TO EXCESSIVE LEVELS OF UN-IONIZED AMMONIA, BIOLOGICAL TREATMENT IN A CONSTRUCTED WETLANDS TREATMENT (CWT) SYSTEM WOULD BE EFFECTIVE. HOWEVER, THE AMOUNT OF LAND REQUIRED FOR CONSTRUCTION OF A WETLANDS TREATMENT SYSTEM THAT WOULD EFFECTIVELY REMOVE CONTAMINANTS TO A LEVEL AT OR BELOW APPLICABLE WATER QUALITY STANDARDS WOULD BE SIGNIFICANTLY GREATER THAN THE AMOUNT OF LAND AVAILABLE. HENCE, SOME FORM OF PRE-TREATMENT WOULD BE NEEDED TO LOWER THE INFLUENT AMMONIA CONCENTRATION AND THEREBY REDUCE THE ACREAGE REQUIRED FOR A CWT SYSTEM.

AIR STRIPPING OF THE LEACHATE-CONTAMINATED GROUNDWATER IS CONSIDERED A COMPATIBLE METHOD OF PRE-TREATMENT. THE GROUNDWATER WOULD BE TREATED USING A SERIES OF AIR STRIPPING TOWERS. THE PH OF THE INFLUENT WOULD BE RAISED TO SHIFT THE AMMONIA TO THE FREE NH₃-N FORM, WHICH WOULD THEN BE

REMOVED BY PASSING AN AIR STREAM (PROVIDED BY AN ONSITE AIR BLOWER) THROUGH THE LEACHATE IN A SERIES OF STRIPPING TOWERS. IT IS ESTIMATED, BASED ON CURRENTLY AVAILABLE DATA, THAT FIVE 14-FOOT DIAMETER TOWERS, EACH AT ABOUT 20-FOOT COLUMN HEIGHT, WOULD BE REQUIRED TO REDUCE THE AMMONIA CONCENTRATION TO AN ACCEPTABLE CONCENTRATION FOR CONTINUED TREATMENT IN A CWT SYSTEM. THE ACTUAL NUMBER AND SIZE OF TOWERS WOULD BE DETERMINED BASED ON THE RESULTS OF THE HYDROLOGIC AND TREATABILITY STUDIES AND PILOT TESTS. COMPLIANCE WITH APPLICABLE AIR EMISSION STANDARDS WOULD BE INCLUDED AS PART OF THE DESIGN CRITERIA FOR THE TREATMENT SYSTEM. ESTIMATES ON INFLUENT AND EFFLUENT CONCENTRATIONS ASSOCIATED WITH THE AIR STRIPPING POND AND LAND REQUIREMENTS FOR THE CWT SYSTEM ARE DESCRIBED IN DETAIL IN THE FS ADDENDUM (1990).

BASED ON EXPERIENCE AT BOTH MUNICIPAL AND INDUSTRIAL WASTEWATER TREATMENT PLANTS, BIOLOGICAL TREATMENT USING A CWT SYSTEM IS AN EFFECTIVE METHOD FOR LOWERING TOTAL AMMONIA NITROGEN ($\text{NH}_3\text{-N}$) CONCENTRATIONS. BIOLOGICAL TREATMENT DEPENDS ON A PROCESS THAT OCCURS IN NATURE KNOWN AS NITRIFICATION. NITRIFICATION IS A PROCESS BY WHICH THE MICROORGANISMS NATURAL TO WETLANDS CHEMICALLY TRANSFORM ($\text{NH}_3\text{-N}$) TO NITRITE ($\text{NO}_2\text{-N}$) AND EVENTUALLY TO NITRATE ($\text{NO}_3\text{-N}$), A PLANT NUTRIENT. A CWT SYSTEM THAT WOULD COMPLETELY TREAT THE LEACHATE WOULD REQUIRE AN AREA FOR THE TREATMENT SYSTEM OF APPROXIMATELY 100 ACRES. HOWEVER, BY PRE-TREATING THE INFLUENT TO REDUCE THE AMMONIA CONCENTRATION BY APPROXIMATELY 50 PERCENT, THE AMOUNT OF LAND REQUIRED FOR THE CWT SYSTEM WOULD BE REDUCED TO APPROXIMATELY 40 ACRES.

IT IS ANTICIPATED THAT THE CWT SYSTEM WOULD BE CONSTRUCTED IN THE HYDROLOGICALLY ALTERED WETLAND AREA NORTH OF THE MANGROVE PRESERVE. FIGURE 8 DENOTES ADJACENT LAND AREAS POTENTIALLY AVAILABLE FOR THE CONSTRUCTION OF THE CWT SYSTEM. THE AREAS ARE DENOTED IN ORDER OF PREFERENCE IN THE FIGURE ALONG WITH THE ESTIMATED SIZE OF THE LAND AREA.

TREATED EFFLUENT FROM THE CWT WOULD BE DISCHARGED TO THE MANGROVE PRESERVE. PRIOR TO DISCHARGE, HOWEVER, EFFLUENT FROM THE CWT WOULD BE MONITORED TO ENSURE THAT AMBIENT WATER QUALITY CRITERIA ARE MET. FINALLY, IT IS ANTICIPATED THAT, ONCE THE TREATMENT IS COMPLETE AND AQUATIC ORGANISMS IN THE MANGROVE PRESERVE NO LONGER EXPERIENCE TOXIC EFFECTS, THE DIKE SEPARATING THE TWO AREAS WOULD BE BREACHED AND THE FULL TIDAL CONNECTION BETWEEN THE HYDROLOGICALLY ALTERED WETLANDS AND MANGROVE PRESERVE WITH BISCAYNE BAY RESTORED. THE TIMING OF THE HYDRAULIC IMPROVEMENTS RELATIVE TO THE CERCLA REMEDIAL ACTION WOULD BE ASSESSED AND DETERMINED BASED ON THE RESULTS OF THE HYDROLOGIC STUDY CONDUCTED PRIOR TO REMEDIAL DESIGN.

A CONTINGENCY PLAN WOULD BE DEVELOPED AS PART OF THE REMEDIAL DESIGN. THIS CONTINGENCY PLAN WOULD CONSIDER THE POTENTIAL FOR SYSTEM MALFUNCTIONS, POWER FAILURES, AND OTHER ADVERSE CONDITIONS THAT COULD CAUSE THE RECOVERY WELLS AND/OR TREATMENT SYSTEM TO BECOME INOPERABLE. THE CONTINGENCY PLAN WOULD PROVIDE MECHANISMS THAT WOULD KEEP THE TOTAL SYSTEM IN AN OPERABLE STATE AND CONTINUE TO MITIGATE THE TOXIC EFFECTS OF THE LEACHATE-CONTAMINATED GROUNDWATER ON AQUATIC LIFE OF THE PRESERVE UNTIL THE PRIMARY COMPONENTS OF THE SYSTEM COULD BE RESTORED.

THE TOTAL PRESENT WORTH COST FOR THIS ALTERNATIVE, INCLUDING COST FOR OPERATION AND MAINTENANCE OVER A 15-YEAR PERIOD, IS ESTIMATED AT \$7,988,000. IT IS ESTIMATED THAT 18 MONTHS WOULD BE NEEDED TO CONSTRUCT AND IMPLEMENT THE REMEDIAL ACTION.

ALTERNATIVE 3 (GROUNDWATER RECOVERY/MECHANICAL TREATMENT)

THIS ALTERNATIVE INCORPORATES THE SAME METHOD OF LEACHATE COLLECTION AND INTERCEPTION AS DESCRIBED IN ALTERNATIVE 2. CONTAMINATED GROUNDWATER WOULD BE MECHANICALLY TREATED IN AN AIR STRIPPING POND TO REMOVE TOXICITY. AIR STRIPPING TOWERS ALONE WERE NOT CONSIDERED AN EFFECTIVE METHOD OF TREATMENT DUE TO THE POTENTIAL FOULING OF THE TOWER PACKING BY HIGH CONCENTRATIONS OF TOTAL DISSOLVED SOLIDS IN THE GROUNDWATER TO BE TREATED. THE NON-TOXIC TREATED EFFLUENT MAY BE CYCLED BACK THROUGH THE LANDFILL TO ENHANCE THE TREATMENT PROCESS OR DISCHARGED TO SURFACE WATER. RESULTS FROM THE HYDROLOGIC AND TREATABILITY STUDIES WOULD BE USED TO DETERMINE WHICH OF

THESE TWO METHODS WILL BE THE MOST APPROPRIATE FOR DISPOSAL OF THE TREATED EFFLUENT. EITHER OF THE DISPOSAL METHODS SELECTED WOULD BE DESIGNED TO COMPLY WITH ALL ARARS.

SINCE TREATMENT OF AMMONIA WITH AIR STRIPPING TOWERS ALONE IS NOT CONSIDERED AN EFFECTIVE MEANS OF COMPLETE TREATMENT, AN ALTERNATE APPROACH IS TO CONDUCT THE AIR STRIPPING IN AN ONSITE STRIPPING POND. PREPARATION OF THE INFLUENT WOULD BE SIMILAR TO THAT REQUIRED FOR A TOWER, ALTHOUGH A HIGHER QUANTITY OF CHEMICALS MAY BE REQUIRED TO MAINTAIN THE PH. THE STRIPPING POND WOULD BE CONSTRUCTED ON THE LANDFILL PROPER AND WOULD LIKELY REQUIRE AN AREA APPROXIMATELY FOUR TO SIX ACRES IN SIZE. THE POND WOULD BE LOCATED AS CLOSE TO THE RECOVERY WELLS AS POSSIBLE; HOWEVER, THE PRECISE LOCATION OF THE POND WOULD BE DETERMINED DURING THE CONCEPTUAL DESIGN PHASE. THE PH OF THE INFLUENT TO THE POND WOULD BE INCREASED TO MAXIMIZE THE PERCENTAGE OF AMMONIA IN THE FREE NH₃-N FORM. AGITATION AND/OR SPRAY SYSTEMS WOULD THEN BE USED TO FACILITATE THE AIR STRIPPING OF THE AMMONIA.

ONE POSSIBLE METHOD FOR DISPOSAL OF THE TREATED EFFLUENT WOULD BE TO CYCLE IT BACK THROUGH THE LANDFILL TO ENHANCE THE TREATMENT PROCESS. A SECOND METHOD WOULD BE TO DISCHARGE IT TO ADJOINING SURFACE WATERS, SUCH AS THE SOUTHERN CANAL OR THE HYDROLOGICALLY ALTERED WETLANDS. IF DISCHARGED TO SURFACE WATER, THE EFFLUENT WOULD BE MONITORED TO ENSURE THAT THE QUALITY OF WATER DISCHARGED COMPLIES WITH ALL APPLICABLE STANDARDS.

THE APPROACH FOR CYCLING THE EFFLUENT BACK THROUGH THE LANDFILL WOULD BE TO PUMP THE EFFLUENT INTO ONE OR MORE OF THE EXISTING LAKES (ASSUMING THEY ARE NOT FILLED DURING LANDFILL CLOSURE) ON THE UPGRADIENT SIDE OF THE LANDFILL OR INTO A SERIES OF SHALLOW SUBTERRANEAN TRENCHES CONSTRUCTED IN THE NORTHEAST SECTION OF THE LANDFILL. NEITHER OPTION WOULD BE EXPECTED TO HAVE ANY ADVERSE EFFECTS ON THE GROUNDWATER SINCE THE CONTAMINANTS WOULD BE REMOVED DURING TREATMENT. BASED ON CURRENTLY AVAILABLE DATA, THIS METHOD OF DISPOSAL IS A FEASIBLE APPROACH. THE EXACT METHOD OF DISCHARGE (LAKES OR SUBTERRANEAN TRENCHES) WOULD BE SELECTED BASED ON THE RESULTS OF THE SITE-SPECIFIC HYDROLOGIC STUDY AND STATE REQUIREMENTS FOR CLOSURE OF THE LANDFILL.

THE APPROPRIATE METHOD FOR DISPOSING OF THE TREATED NON-TOXIC EFFLUENT (SURFACE WATER OR GROUNDWATER) WOULD BE SELECTED ON THE BASIS OF THE HYDROLOGIC AND TREATABILITY STUDIES CONDUCTED PRIOR TO THE REMEDIAL DESIGN. IF SURFACE DISCHARGE IS SELECTED AS THE MOST APPROPRIATE, THE EFFLUENT WOULD BE MONITORED, AND IF NECESSARY FURTHER TREATED, TO ENSURE THAT ARARS ARE MET.

A CONTINGENCY PLAN WOULD BE DEVELOPED AS PART OF THE REMEDIAL DESIGN. THIS CONTINGENCY PLAN WOULD CONSIDER THE POTENTIAL FOR SYSTEM MALFUNCTIONS, POWER FAILURES, AND OTHER ADVERSE CONDITIONS THAT COULD CAUSE THE RECOVERY WELLS AND/OR TREATMENT SYSTEM TO BECOME INOPERABLE. THE CONTINGENCY PLAN WOULD PROVIDE MECHANISMS THAT WOULD KEEP THE TOTAL SYSTEM IN AN OPERABLE STATE AND CONTINUE TO MITIGATE THE TOXIC EFFECTS OF THE LEACHATE-CONTAMINATED GROUNDWATER ON AQUATIC LIFE OF THE PRESERVE UNTIL THE PRIMARY COMPONENTS OF THE SYSTEM COULD BE RESTORED.

THE TOTAL PRESENT WORTH COST FOR IMPLEMENTATION OF THIS REMEDIAL ALTERNATIVE IS ESTIMATED AT \$6,166,000. THIS ESTIMATE IS BASED ON A 15-YEAR PERIOD OF OPERATION AND MAINTENANCE. THE ESTIMATED TIME FOR CONSTRUCTION AND IMPLEMENTATION OF THIS REMEDY IS 18 MONTHS.

ALTERNATIVE 4 (POSITIVE INFILTRATION HYDRAULIC BARRIER/GROUNDWATER RECOVERY/BIOLOGICAL TREATMENT)

THE BASIC APPROACH FOR ALTERNATIVE 4 WAS DEVELOPED BY THE TAC UNDER THE SUPERVISION OF FDER. THIS ALTERNATIVE WAS EVALUATED BY EPA AND WAS INCLUDED IN THE GROUP OF POTENTIAL REMEDIAL ALTERNATIVES ON THE BASIS OF ITS TECHNICAL MERIT. ALTHOUGH THE OBJECTIVE OF THE ALTERNATIVE WAS WELL DEFINED, IN SOME INSTANCES, VARIOUS ELEMENTS OF THE SCOPE CONTAINED SEVERAL DIFFERENT APPROACHES TO ACCOMPLISH THE SAME TASK. BECAUSE IT WAS NECESSARY FOR EPA TO PREPARE A COST ESTIMATE FOR ALTERNATIVE 4 AND CONDUCT A COMPARATIVE ANALYSIS OF COSTS AMONG ALL OF THE

ALTERNATIVES, IT WAS INCUMBENT UPON THE AGENCY TO ASSUME CERTAIN FEATURES TO PROPERLY EVALUATE THE ALTERNATIVE. THE AGENCY RECOGNIZES THAT MANY OF THE ELEMENTS OF THIS ALTERNATIVE HAVE TECHNICAL MERIT AND MAY WARRANT FURTHER CONSIDERATION. AS A RESULT, A COMPLETE DESCRIPTION OF THIS ALTERNATIVE AS RECOMMENDED BY THE TAC IS PROVIDED IN APPENDIX D.

ALTERNATIVE 4 RELIES ON TECHNIQUES SIMILAR TO THOSE DESCRIBED IN ALTERNATIVE 3 IN THAT IT WOULD EMPLOY A HYDRAULIC BARRIER IN CONJUNCTION WITH LANDFILL LEACHATE COLLECTION AND TREATMENT TO PROTECT THE MANGROVE PRESERVE. THE HYDRAULIC BARRIER, HOWEVER, WOULD RELY ON POSITIVE INFILTRATION RATHER THAN WITHDRAWAL OF THE GROUNDWATER. TO ENSURE THAT THE CONTAMINATED GROUNDWATER IS NOT MERELY CONTAINED OR DIVERTED TO ANOTHER AREA, THE CONTAMINATED GROUNDWATER WOULD BE WITHDRAWN USING A SERIES OF RECOVERY WELLS LOCATED IN AREAS ON THE LANDFILL EXHIBITING THE HIGHEST LEVELS OF CONTAMINATION. TREATED EFFLUENT WOULD THEN BE DISCHARGED TO SURFACE WATER. THE BASIC APPROACH TO THIS ALTERNATIVE WAS DEVELOPED AND RECOMMENDED BY THE TAC FOR THE ABATEMENT OF THE THREAT TO THE AQUATIC LIFE OF THE STATE MANGROVE PRESERVE. HOWEVER, FOR PURPOSES OF ANALYZING COSTS AND IMPLEMENTABILITY OF THE ALTERNATIVE, IT WAS NECESSARY FOR EPA TO MODIFY CERTAIN ELEMENTS OF THE APPROACH.

THE HYDRAULIC BARRIER WOULD BE CREATED ALONG THE LANDFILL SIDE OF THE MANGROVE PRESERVE BY CONSTRUCTING A DIKED, OPEN TRENCH, AND CONTINUALLY PUMPING UNCONTAMINATED WATER INTO THE TRENCH. A TENTATIVE LOCATION FOR THE TRENCH IS SHOWN IN FIGURE 9. THIS WOULD MAINTAIN A LEVEL OF WATER IN THE TRENCH HIGHER THAN THAT IN THE PRESERVE AND BISCAYNE BAY. THIS WOULD, IN ESSENCE, FORCE DOWN A CONSTANT WEDGE OF WATER INTO THE AQUIFER, PREVENTING THE MIGRATION OF CONTAMINATED GROUNDWATER INTO THE PRESERVE. THIS SAME EFFECT MAY ALSO BE ACCOMPLISHED BY FLOODING THE HYDROLOGICALLY ALTERED WETLAND AREA BETWEEN THE LANDFILL AND THE MANGROVE PRESERVE. THE ACTUAL METHOD FOR CONSTRUCTION OF THE BARRIER WOULD BE DETERMINED DURING CONCEPTUAL DESIGN AFTER THE COLLECTION AND EVALUATION OF SITE-SPECIFIC HYDROLOGIC DATA.

IT IS ANTICIPATED AT THIS TIME THAT THE WATER FOR THE HYDRAULIC BARRIER WOULD INITIALLY BE OBTAINED FROM SOME OF THE RELATIVELY UNCONTAMINATED LAKES ALONG THE SOUTH SIDE OF THE LANDFILL THAT REMAIN UNFILLED AFTER LANDFILL CLOSURE. PUMPING OF GROUNDWATER FROM THESE LAKES FOR THE MAINTENANCE OF THE HYDRAULIC BARRIER MAY EFFECTIVELY INDUCE A LOCAL GROUNDWATER GRADIENT TOWARD THESE LAKES. ALTHOUGH THESE LAKES ARE RELATIVELY CLEAN AT PRESENT, THIS INDUCED GRADIENT MAY RESULT IN THE MIGRATION OF CONTAMINATION TO THE SOUTH AND SUBSEQUENT CONTAMINATION OF THESE LAKES. IN THE EVENT THE LAKES BECOME CONTAMINATED TO THE POINT THAT THE WATER QUALITY NO LONGER COMPLIED WITH APPLICABLE STANDARDS, THE WATER WOULD BE TREATED PRIOR TO USE IN MAINTAINING THE HYDRAULIC BARRIER.

ALTHOUGH THE HYDRAULIC BARRIER COULD EFFECTIVELY PREVENT THE MIGRATION OF LEACHATE-CONTAMINATED GROUNDWATER FROM THE LANDFILL TO THE MANGROVE PRESERVE, IT WOULD MERELY CONTAIN OR POSSIBLY DIVERT THE CONTAMINATED GROUNDWATER AROUND THE PRESERVE TO OTHER AREAS. THEREFORE, CONTAMINATED GROUNDWATER WOULD BE RECOVERED FROM AREAS ON THE LANDFILL EXHIBITING THE HIGHEST LEVELS OF CONTAMINATION. THE METHOD OF LEACHATE COLLECTION MAY INCLUDE THE PUMPING OF GROUNDWATER FROM WELLS OR FROM THE ONSITE LAKES. THE METHOD OF LEACHATE COLLECTION WOULD BE DETERMINED DURING THE REMEDIAL DESIGN PHASE AS A RESULT OF THE DATA COLLECTED DURING THE HYDROLOGIC STUDY. IF RECOVERY WERE DETERMINED TO BE THE APPROPRIATE METHOD FOR GROUNDWATER RECOVERY, IT IS ESTIMATED THAT A TOTAL OF 15 WELLS, PUMPING AT A RATE OF 1.3 MGD, WOULD BE REQUIRED TO EFFECTIVELY CAPTURE THE LEACHATE-CONTAMINATED GROUNDWATER. A TENTATIVE LOCATION FOR THE GROUNDWATER RECOVERY SYSTEM IS SHOWN IN FIGURE 9.

SINCE THE GROUNDWATER RECOVERED FROM THE LANDFILL AREA FOR TREATMENT WOULD BE EXPECTED TO HAVE A HIGHER CONCENTRATION OF AMMONIA, AND POSSIBLY LOWER SALINITY, CONVENTIONAL BIOLOGICAL TREATMENT COULD BE USED. THIS SYSTEM WOULD EFFECTIVELY TREAT ORGANIC COMPOUNDS AND CONVERT THE AMMONIA TO NITRITE. HOWEVER, IT IS ANTICIPATED THAT A SUFFICIENT QUANTITY OF ORGANIC COMPOUNDS WOULD NOT BE PRESENT IN THE INFLUENT TO COMPLETE THE CONVERSION TO NITRATE. THE CONVERSION WOULD BE

COMPLETED IN A 10- TO 20-ACRE CWT SYSTEM CONSTRUCTED IN THE UPLAND AREAS ON OR ADJACENT TO THE LANDFILL. ACCORDING TO FDER, THE LEACHATE COLLECTION AND TREATMENT SYSTEM WOULD BE REQUIRED AS PART OF LANDFILL CLOSURE UNDER FLORIDA'S LANDFILL CLOSURE LAW.

IF AN EFFECTIVE LEACHATE COLLECTION AND TREATMENT SYSTEM IS REQUIRED BY FDER IN THE LANDFILL CLOSURE, THE EXTENT OF THE SUPERFUND RESPONSE ACTION WOULD BE THE CONSTRUCTION OF THE HYDRAULIC BARRIER ALONG THE MANGROVE PRESERVE DIKE. IN THE EVENT THAT BIOLOGICAL TREATMENT IS DETERMINED NOT TO BE APPROPRIATE BASED ON THE RESULTS OF THE HYDROLOGIC AND TREATABILITY STUDIES, AN ALTERNATE METHOD OF LEACHATE TREATMENT WOULD BE IDENTIFIED BY FDER IN CONSULTATION WITH EPA. IF TREATMENT OF LEACHATE WERE NOT BEING PERFORMED IN AN ADEQUATE AND TIMELY MANNER, EPA WOULD EVALUATE WHETHER ACTION UNDER CERCLA IS WARRANTED.

A CONTINGENCY PLAN WOULD BE DEVELOPED AS PART OF THE REMEDIAL DESIGN. THIS CONTINGENCY PLAN WOULD CONSIDER THE POTENTIAL FOR SYSTEM MALFUNCTIONS, POWER FAILURES, AND OTHER ADVERSE CONDITIONS THAT COULD CAUSE THE RECOVERY WELLS AND/OR TREATMENT SYSTEM TO BECOME INOPERABLE. THE CONTINGENCY PLAN WOULD PROVIDE MECHANISMS THAT WOULD KEEP THE TOTAL SYSTEM IN AN OPERABLE STATE AND CONTINUE TO MITIGATE THE TOXIC EFFECTS OF THE LEACHATE-CONTAMINATED GROUNDWATER ON AQUATIC LIFE OF THE PRESERVE UNTIL THE PRIMARY COMPONENTS OF THE SYSTEM COULD BE RESTORED.

THE TOTAL PRESENT WORTH COST FOR IMPLEMENTATION OF THIS REMEDIAL ALTERNATIVE IS ESTIMATED AT \$11,567,000. AS DISCUSSED IN THE EPA FS ADDENDUM (DRAFT, 1990), THIS ESTIMATE WAS DEVELOPED USING CURRENTLY AVAILABLE INFORMATION AND IS SUBJECT TO CHANGE AFTER THE COLLECTION OF SITE-SPECIFIC HYDROLOGIC DATA. AS REPORTED BY FDER, THE HYDROLOGIC STUDY MAY DEMONSTRATE THAT THE SCOPE OF THIS ALTERNATIVE IS MORE COST EFFECTIVE THAN ORIGINALLY ESTIMATED IN THE EPA FS ADDENDUM. FURTHERMORE, DEPENDING ON THE SCOPE OF THE LANDFILL CLOSURE REQUIREMENTS IDENTIFIED BY FDER, ALTERNATIVE 4 MAY INCORPORATE ELEMENTS THAT WILL FULFILL SOME OF THE LANDFILL CLOSURE REQUIREMENTS AND POSSIBLY REDUCE THE TOTAL COSTS OF THE CERCLA RESPONSE AND LANDFILL CLOSURE ACTIONS. FINALLY, THE ESTIMATE IS BASED ON A 15-YEAR PERIOD OF OPERATION AND MAINTENANCE AND PROJECTS A CONSTRUCTION AND IMPLEMENTATION TIME OF 24 MONTHS.

ARARS

IN ADDITION TO THE ISSUES ASSOCIATED WITH USE OF THE HYDROLOGICALLY ALTERED WETLAND AS PART OF THE TREATMENT SYSTEM, THERE ARE SEVERAL ARARS AND NON-PROMULGATED ENVIRONMENTAL STANDARDS OR CRITERIA TO BE CONSIDERED WITH THE IMPLEMENTATION OF THIS REMEDY. THESE ARARS AND ENVIRONMENTAL CRITERIA TO BE CONSIDERED (TBC) ARE LISTED AS FOLLOWS.

ARARS

FEDERAL

- CLEAN WATER ACT (CWA), AMBIENT WATER QUALITY CRITERIA FOR SURFACE WATER DISCHARGE.
- EPA AMBIENT SALTWATER QUALITY CRITERIA FOR UN-IONIZED AMMONIA (EPA 440/5-88-004).
- CWA SECTION 402 NPDES PERMIT, SUBSTANTIVE REQUIREMENTS.
- CWA SECTION 404, PERMITS FOR DREDGED OR FILL MATERIAL.

STATE OF FLORIDA

- FLORIDA WATER QUALITY PROVISIONS, GENERAL AND CLASS III (BOTH NUMERIC AND NARRATIVE) FOR ALL CONTAMINANTS IN DISCHARGE.

- FLORIDA STATUTES (CHAPTER 258.397) WHICH SPECIFY THAT "NO WASTE OR EFFLUENT THAT WOULD SUBSTANTIALLY INHIBIT THE ACCOMPLISHMENT OF THIS SECTION SHALL BE DISCHARGED INTO THE PRESERVE". THIS IS AN ENCOMPASSING QUALITATIVE CRITERION WHICH WOULD REQUIRE THAT DISCHARGE FROM THE REMEDIAL ACTION INTO ANY PORTION OF THE BISCAYNE BAY AQUATIC PRESERVE (INCLUDING THE MANGROVE PRESERVE) NOT RESULT IN ANY DEGRADATION OF THESE AREAS.
- PURSUANT TO FAC CHAPTER 18-18.001, THE EFFLUENT DISCHARGED FROM THE TREATMENT SYSTEM MUST NOT PRESENT A THREAT TO THE ACCOMPLISHMENT OF THE GOALS FOR THE PROTECTION AND ENHANCEMENT OF THE BIOLOGICAL AND AESTHETIC VALUES OF THE BISCAYNE BAY AQUATIC PRESERVE (INCLUDING THE MANGROVE PRESERVE).
- PURSUANT TO FAC CHAPTER 17-3, EFFLUENT ENTERING THE BISCAYNE BAY AQUATIC PRESERVE (INCLUDING THE MANGROVE PRESERVE) MUST MEET OUTSTANDING FLORIDA WATER QUALITY CRITERIA, E.G., NO DISCHARGE OF CONTAMINANTS ABOVE BACKGROUND CONCENTRATIONS.
- PURSUANT TO FAC CHAPTER 373, CRITERIA ARE DEVELOPED BY THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT (SFWMD) TO ENSURE THAT THE USE OF AN AQUIFER IS REASONABLE AND BENEFICIAL, AND DOES NOT CAUSE ANY ADVERSE IMPACT ON USERS. THESE CRITERIA POTENTIALLY APPLY TO THE RECOVERY OF GROUNDWATER FOR TREATMENT AND THE DISCHARGE OF TREATED EFFLUENT TO GROUNDWATER.
- CHAPTER 40E-3 AND 40E-30, FLORIDA ADMINISTRATIVE CODE, CONTAINS STANDARDS FOR THE CONSTRUCTION OF WELLS. THE SUBSTANTIVE REQUIREMENTS FOR THESE STANDARDS WILL BE CONSIDERED AND USED TO SUPPLEMENT, IF DETERMINED TO BE MORE STRINGENT, THE EPA GUIDANCE FOR THE CONSTRUCTION OF WELLS. MOREOVER, NO WELL CONSTRUCTION PERMIT WILL BE OBTAINED FROM THE SFWMD PURSUANT TO SECTION 121(E)(1) OF CERCLA.

TBC
FEDERAL

- ENDANGERED SPECIES ACT, SECTION 7(A), REQUIRES CONSULTATION WITH THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) AND THE DEPARTMENT OF INTERIOR (DOI) TO ENSURE THAT REMEDIAL ACTIONS TAKEN PURSUANT TO CERCLA DO NOT JEOPARDIZE OR ADVERSELY MODIFY OR DESTROY CRITICAL HABITATS OF ENDANGERED OR THREATENED SPECIES.
- COSTAL ZONE MANAGEMENT ACT, REQUIRES FEDERAL AGENCIES TO CONDUCT THEIR ACTIVITIES IN A MANNER THAT WOULD BE CONSISTENT WITH LOCAL COSTAL ZONE MANAGEMENT PLANS.
- APPLICABLE AIR QUALITY CRITERIA. POTENTIAL VOLATILE ORGANIC COMPOUND (VOC) EMISSIONS SHOULD BE LIMITED TO 3 POUNDS PER HOUR, 15 POUNDS PER DAY, OR 10 POUNDS PER YEAR (OSWER DIRECTIVE 9355.0-28).

STATE OF FLORIDA

- CHAPTER 17-701, FLORIDA ADMINISTRATIVE CODE (FAC), PROVIDES REGULATIONS FOR CLOSURE OF LANDFILLS. THESE REGULATIONS WILL BE CONSIDERED DURING THE DESIGN OF THE SUPERFUND REMEDIAL ACTION TO ENSURE THAT THE TWO ACTIONS ARE COMPATIBLE.
- SUBSTANTIVE REQUIREMENTS OF THE SFWMD STORMWATER RUNOFF REGULATIONS, FAC 17-25, WILL BE CONSIDERED DURING THE DESIGN OF THE SUPERFUND REMEDIAL ACTION. NO PERMITS WILL BE OBTAINED, HOWEVER, PURSUANT TO SECTION 121(E)(1) OF CERCLA.

DADE COUNTY

- DADE COUNTY CRITERIA FOR SURFACE WATERS (DADE COUNTY CODE, CHAPTER 24, SECTION 11), TOTAL AMMONIA (500 UG/L) AND UN-IONIZED AMMONIA (20 UG/L) (UN-IONIZED AMMONIA FOR PREDOMINANTLY FRESHWATER).
- DADE COUNTY CRITERIA FOR GROUNDWATER (DADE COUNTY CODE, CHAPTER 24, SECTION 11), TOTAL AMMONIA (500 UG/L) AND UN-IONIZED AMMONIA (20 UG/L), BOTH EXPRESSED AS N.
- AIR QUALITY STANDARDS (AIR STRIPPING).
- DADE COUNTY WELLFIELD PROTECTION PLAN MANDATES NO NET LOSS OF WATER FROM THE BISCAYNE AQUIFER.

CLEANUP CRITERIA

THE OBJECTIVE OF THIS SUPERFUND REMEDIAL ACTION IS TO REMOVE THE TOXICITY ASSOCIATED WITH THE GROUNDWATER THAT IS CURRENTLY EMERGING IN THE STATE MANGROVE PRESERVE. THIS WOULD BE ACCOMPLISHED BY INCORPORATING TWO ELEMENTS. FIRST, THE LEACHATE-CONTAMINATED GROUNDWATER WOULD BE INTERCEPTED BEFORE IT COULD EMERGE IN THE SURFACE WATER OF THE PRESERVE. SECOND, THIS CONTAMINATED WATER WOULD BE COLLECTED AND TREATED TO REMOVE ITS TOXICITY. SINCE THE CONTAMINATION IS RESULTING FROM A CONTINUAL RELEASE OF CONTAMINANTS FROM THE LANDFILL, AND SINCE IT WOULD BE INFEASIBLE TO COMPLETELY REMOVE THE SOURCE OF CONTAMINATION (I.E., THE 170-ACRE LANDFILL), MONITORING OF SURFACE WATER AND GROUNDWATER DURING AND AFTER THE REMEDIAL ACTION WOULD BE NECESSARY TO MEASURE THE EFFECTIVENESS OF THE REMEDIAL ACTION AND TO DETERMINE THE POINT AT WHICH THE REMEDIAL ACTION IS COMPLETE.

THIS BASIC CRITERIA FOR CLEANUP OF THE SITE ARE THE SAME FOR ALL OF THE REMEDIAL ALTERNATIVES THAT INCLUDE REMEDIAL ACTION AT THE SITE. SINCE THE DETAILS FOR MEETING THE CLEANUP CRITERIA VARY AMONG THE ALTERNATIVES, A DETAILED DESCRIPTION OF THE CLEANUP CRITERIA IS PROVIDED ONLY FOR THE SELECTED REMEDY. THE DETAILED DISCUSSION IS PROVIDED IN SECTION 10.3 OF THIS ROD.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

THIS SECTION PROVIDES THE BASIS FOR DETERMINING WHICH ALTERNATIVE PROVIDES THE "BEST BALANCE" OF TRADE-OFFS WITH RESPECT TO THE EVALUATION CRITERIA. A GLOSSARY OF THE EVALUATION CRITERIA IS PROVIDED IN TABLE 6.

OVERALL PROTECTION

ALL OF THE ALTERNATIVES, WITH THE EXCEPTION OF THE "NO ACTION" ALTERNATIVE, WOULD PROVIDE ADEQUATE PROTECTION OF THE ENVIRONMENT BY ELIMINATING, REDUCING, AND/OR CONTROLLING THE THREAT TO THE ENVIRONMENT THROUGH TREATMENT AND ENGINEERING CONTROLS. WITH THE EXCEPTION OF THE "NO ACTION" ALTERNATIVE, ALL OF THE ALTERNATIVES WOULD INTERCEPT, COLLECT, AND TREAT THE LEACHATE-CONTAMINATED GROUNDWATER, THUS REDUCING THE TOXICITY TO AQUATIC ORGANISMS IN THE STATE MANGROVE PRESERVE. BECAUSE THE "NO ACTION" ALTERNATIVE WOULD NOT BE PROTECTIVE OF THE ENVIRONMENT, IT IS NOT CONSIDERED FURTHER IN THIS ANALYSIS.

COMPLIANCE WITH ARARS

ALL OF THE ALTERNATIVES WOULD MEET THEIR RESPECTIVE ARARS OF FEDERAL AND STATE ENVIRONMENTAL LAWS (1). THE PLANNED REMEDIAL ACTION COMPLIES WITH THE STANDARDS OF THE CWA, INCLUDING SECTION 404(B)(1), STANDARDS (40 CFR PART 230), AND THE SECTION 404(C) STANDARD (NO ACCEPTABLE ADVERSE EFFECTS ON MUNICIPAL WATER SUPPLIES, FISH AND SHELLFISH AREAS, WILDLIFE OR RECREATION).

(1) THE CWA 404(C) ACTION TAKEN IN 1981 ALLOWS THE EXCAVATION OF UP TO 19 ACRES OF WETLAND AREAS

FOR LANDFILL COVER. THE CERCLA ACTION WILL INVOLVE CONSIDERABLY LESS IMPACT ON THE WETLANDS THAN IS PERMITTED UNDER THE 404(C) ACTION.

THE DISTINCTION AMONG THE ALTERNATIVES, WITH RESPECT TO ARARS, IS WITH THE NUMBER OF ARARS THAT MUST BE COMPLIED WITH FOR EACH ALTERNATIVE. EACH OF THE ALTERNATIVES WOULD REQUIRE DISCHARGE OF TREATED EFFLUENT. EFFLUENT ASSOCIATED WITH ALTERNATIVE 2 (RECOVERY WELLS/CWT SYSTEM) WOULD BE DISCHARGED TO SURFACE WATER. ALTERNATIVE 3 MAY DISCHARGE TREATED EFFLUENT TO SURFACE WATER OR GROUNDWATER. EFFLUENT ASSOCIATED WITH ALTERNATIVE 4 WOULD BE DISCHARGED ONLY TO GROUNDWATER THROUGH THE POSITIVE INFILTRATION SYSTEM. AS INDICATED IN SECTION 8.3, THERE ARE A SIGNIFICANT NUMBER OF ARARS THAT MUST BE COMPLIED WITH IF TREATED EFFLUENT IS DISCHARGED TO SURFACE WATER. THE MOST STRINGENT INCLUDE THE STATE REGULATIONS SUCH AS OUTSTANDING FLORIDA WATER QUALITY CRITERIA AND THE GENERAL AND CLASS III WATERS CRITERIA.

THESE CRITERIA PROVIDE FOR NO DEGRADATION OF WATER QUALITY THROUGH REQUIREMENTS SUCH AS NO TOXICITY AND COMPLIANCE WITH NUMERICAL STANDARDS. THESE CRITERIA WOULD APPLY NOT ONLY TO AMMONIA, BUT ALL OF THE CHEMICALS PRESENT IN THE GROUNDWATER THAT MAY POTENTIALLY BE DISCHARGED TO SURFACE WATER.

SINCE THE GROUNDWATER IN THE VICINITY OF THE SITE IS SALINE AND NOT POTABLE, IT HAS NO REASONABLE POTENTIAL AS A FUTURE SOURCE OF DRINKING WATER. THIS PORTION OF THE BISCAYNE AQUIFER IS CLASSIFIED AS A CLASS G-III (NON-POTABLE) AQUIFER PURSUANT TO SECTION 17-3.401 OF THE FAC. AS A RESULT, DRINKING WATER STANDARDS (MCLS OR MCLGS) DEVELOPED FOR THE PROTECTION OF HUMAN HEALTH ARE NOT APPLICABLE OR RELEVANT AND APPROPRIATE.

CRITERIA CONTAINED WITHIN THE FAC, SECTION 17-3.401, ALSO PROVIDE FOR THE PROTECTION OF AQUATIC LIFE IN SURFACE WATER AT THE POINT OF DISCHARGE FROM GROUNDWATER. THE FDER CRITERIA WOULD BE CONSIDERED RELEVANT FOR THE CONTAMINANTS PRESENT IN GROUNDWATER. ALTERNATIVE 3, WITH GROUNDWATER DISCHARGE OF TREATED EFFLUENT, WOULD EFFECTIVELY COMPLY WITH THIS ARAR. TREATED EFFLUENT WOULD BE CYCLED BACK THROUGH THE LANDFILL AND RECOLLECTED BY THE RECOVERY WELLS FOR ADDITIONAL TREATMENT. BY RECYCLING THE TREATED GROUNDWATER THROUGH THE AQUIFER, GROUNDWATER FROM THE SITE AREA WOULD BE PREVENTED FROM DISCHARGING INTO NEARBY SURFACE WATER, AND THUS THE ALTERNATIVE WOULD COMPLY WITH THE FDER ARAR. SINCE ALTERNATIVE 4 RELIES ON THE DISCHARGE OF TREATED EFFLUENT TO GROUNDWATER TO HELP MAINTAIN THE HYDRAULIC BARRIER, THE POTENTIAL EXISTS FOR GROUNDWATER FROM THE HYDRAULIC BARRIER TO MIGRATE EASTWARD TOWARD (AND SURFACE IN) THE WATERS OF THE MANGROVE PRESERVE. AS A RESULT, TREATED EFFLUENT WOULD HAVE TO BE MONITORED PRIOR TO DISCHARGE TO THE HYDRAULIC BARRIER TO ENSURE COMPLIANCE WITH THE APPLICABLE WATER QUALITY STANDARDS.

IN ADDITION TO ARARS, TWO OTHER REGULATIONS WERE IDENTIFIED FOR CONSIDERATION. THE FIRST OF THESE IS THE STATE OF FLORIDA SFWMD PERMITTING REQUIREMENTS THAT REGULATE DISCHARGES TO GROUNDWATER. SPECIFIC CONCERNS OF SFWMD AT THIS SITE ARE THAT DISCHARGE OF POTENTIALLY SALINE WATER INTO THE AQUIFER MAY INDUCE ADDITIONAL SALTWATER INTRUSION. BASED ON CURRENTLY AVAILABLE DATA, EPA HAS DETERMINED THAT THE SALTWATER INTRUSION EFFECTS WOULD BE MINIMAL, IF ANY, SINCE THE POINT OF DISCHARGE TO THE AQUIFER IS WELL BEYOND THE ZONE OF SALTWATER INTRUSION. EPA PLANS TO AUGMENT AVAILABLE HYDROLOGIC DATA WITH ADDITIONAL STUDY DURING REMEDIAL DESIGN. THESE DATA WILL BE USED TO VALIDATE THE APPROPRIATENESS OF GROUNDWATER DISCHARGE OF TREATED EFFLUENT. IF DISCHARGE OF TREATED EFFLUENT TO GROUNDWATER IS DETERMINED TO BE APPROPRIATE, PURSUANT TO SECTION 121(E)(1) OF CERCLA, EPA IS NOT REQUIRED TO OBTAIN A PERMIT FOR THE ONSITE PORTION OF AN SUPERFUND REMEDIAL ACTION. SINCE ANY DISCHARGE OF EFFLUENT WOULD OCCUR ONSITE, THE SUBSTANTIVE REQUIREMENTS OF THIS REGULATION WOULD BE MET BUT NO PERMIT WOULD BE NECESSARY.

THE OTHER ENVIRONMENTAL REGULATION TO BE CONSIDERED PERTAINS TO THE PROTECTION OF THE INTEGRITY OF THE FRESHWATER PORTION OF THE BISCAYNE AQUIFER. AS PART OF THE DADE COUNTY WELLFIELD PROTECTION PLAN, THERE ARE PROVISIONS THAT CALL FOR ESSENTIALLY NO NET LOSS OF WATER FROM THE

BISCAYNE AQUIFER AS A RESULT OF SURFACE WATER DISCHARGES FROM GROUNDWATER RESOURCES. THIS IS CONSIDERED A WATER CONSERVATION MECHANISM THAT FURTHER PROTECTS THE POTABLE PORTION OF THE BISCAYNE AQUIFER FROM SALTWATER INTRUSION. ALTERNATIVES 3 (WITH GROUNDWATER DISCHARGE OPTION) AND 4 WOULD BOTH COMPLY WITH THIS COUNTY REGULATION. ALTERNATIVE 2, WHICH INCLUDES SURFACE DISCHARGE OF TREATED EFFLUENT, WOULD NOT COMPLY WITH THIS REGULATION.

IN SUMMARY, ALTERNATIVE 3 (RECOVERY WELLS/AIR STRIPPING/GROUNDWATER DISCHARGE) WOULD HAVE THE LEAST NUMBER OF ARARS WITH WHICH TO COMPLY. ALTERNATIVE 4 (POSITIVE INFILTRATION) WOULD HAVE TO COMPLY WITH THE FDER WATER QUALITY STANDARDS FOR DISCHARGE OF TREATED EFFLUENT TO GROUNDWATER. THE SUBSTANTIVE REQUIREMENTS OF THE STATE OF FLORIDA SFWMD REGULATIONS CONCERNING GROUNDWATER DISCHARGE WOULD BE CONSIDERED, BUT NO PERMIT WOULD BE REQUIRED DUE TO THE ONSITE NATURE OF THE ACTIONS AND MINIMAL EFFECTS ON SALTWATER INTRUSION. MOREOVER, THESE TWO ALTERNATIVES WOULD COMPLY WITH DADE COUNTY WATER CONSERVATION POLICY. ALTERNATIVES 2 (RECOVERY WELLS/CWT SYSTEM) AND 3 (RECOVERY WELLS/AIR STRIPPING/SURFACE WATER DISCHARGE) WOULD COMPLY WITH THE NUMEROUS STATE AND FEDERAL WATER QUALITY CRITERIA. THESE TWO ALTERNATIVES, WHICH INCORPORATE SURFACE DISCHARGE OF TREATED EFFLUENT, WOULD COMPLY WITH THE SFWMD REGULATION CONCERNING SALTWATER INTRUSION, BUT NOT THE DADE COUNTY WATER CONSERVATION POLICY. IN CONSIDERATION OF ALL OF THE ARARS AND TBCS, ALTERNATIVES 3, WITH GROUNDWATER DISCHARGE, WOULD ACHIEVE THE BEST BALANCE.

LONG-TERM EFFECTIVENESS AND PERMANENCE

ALL OF THE REMEDIAL ACTION ALTERNATIVES WOULD EFFECTIVELY MITIGATE THE RELEASE OF TOXIC LEACHATE FROM THE MUNISPORT LANDFILL TO THE STATE MANGROVE PRESERVE. IT SHOULD BE NOTED, HOWEVER, THAT THE EFFECTIVENESS AND PERMANENCE OF ALTERNATIVE 4 (POSITIVE INFILTRATION HYDRAULIC BARRIER) WOULD BE CONTINGENT ON THE INCORPORATION OF A LEACHATE COLLECTION AND TREATMENT SYSTEM AS PART OF THE LANDFILL CLOSURE REQUIREMENTS. WITHOUT THIS REQUIREMENT FOR ALTERNATIVE 4, THE REMEDIAL ACTION WOULD ONLY CONTAIN OR DIVERT THE CONTAMINANTS AND WOULD RESULT IN A LESSER DEGREE OF LONG-TERM EFFECTIVENESS AND PERMANENCE THAN ALTERNATIVE 3.

REDUCTION OF TOXICITY, MOBILITY, OR VOLUME OF THE CONTAMINANTS THROUGH TREATMENT

ALL OF THE ALTERNATIVES WOULD REDUCE THE TOXICITY OF THE LEACHATE THROUGH INTERCEPTION, COLLECTION, AND TREATMENT. THE ALTERNATIVES WOULD ALSO REDUCE THE MOBILITY AND VOLUME OF THE CONTAMINANTS BY INTERCEPTING AND TREATING THE LEACHATE-CONTAMINATED GROUNDWATER. IT SHOULD BE NOTED, HOWEVER, THAT THE ABILITY OF ALTERNATIVE 4 TO EFFECTIVELY REDUCE THE TOXICITY, MOBILITY, AND VOLUME OF CONTAMINANTS PRESENT IN THE LEACHATE WOULD BE CONTINGENT ON THE INCORPORATION OF A LEACHATE COLLECTION AND TREATMENT SYSTEM AS PART OF THE LANDFILL CLOSURE REQUIREMENTS. WITHOUT THIS REQUIREMENT FOR ALTERNATIVE 4, THE REMEDIAL ACTION WOULD ONLY CONTAIN THE CONTAMINANTS AND NOT SERVE TO REDUCE THEIR TOXICITY OR VOLUME. MOREOVER, WITHOUT COLLECTION AND TREATMENT OF THE CONTAMINATED GROUNDWATER, THE POTENTIAL EXISTS FOR CONTAMINANTS TO BE DIVERTED FURTHER INTO THE MANGROVE PRESERVE OR TO OTHER SURFACE WATERS.

SHORT-TERM EFFECTIVENESS

FACTORS AFFECTING THE SHORT-TERM EFFECTIVENESS OF THE ALTERNATIVES MAINLY INCLUDE ADMINISTRATIVE CONSIDERATIONS COMMON TO EACH OF THE REMEDIAL ALTERNATIVES. MOREOVER, EACH OF THE ALTERNATIVES WOULD REQUIRE THE SAME TYPE OF DESIGN STUDIES PRIOR TO CONSTRUCTION OF THE REMEDY. HENCE, NO SIGNIFICANT DISTINCTION CAN BE MADE AMONG THE ALTERNATIVES ON THE BASIS OF SHORT-TERM EFFECTIVENESS.

IMPLEMENTABILITY

THE MAIN DISTINCTIONS AMONG THE ALTERNATIVES CENTER AROUND THE METHODS OF TREATMENT AND DISPOSAL OF TREATED GROUNDWATER. TREATMENT METHODS INCLUDE AIR STRIPPING OR BIOLOGICAL TREATMENT, OR

SOME COMBINATION OF THE TWO. DISPOSAL METHODS FOR THE TREATED GROUNDWATER INCLUDE DISCHARGE TO SURFACE WATER OR GROUNDWATER. SINCE EACH OF THESE METHODS OF TREATMENT AND DISPOSAL HAVE UNIQUE IMPLEMENTATION CONCERNS, IT IS DIFFICULT TO IDENTIFY THE MOST IMPLEMENTABLE ALTERNATIVE.

FINALLY, ALTERNATIVE 4 HAS SEVERAL CONTINGENCIES ASSOCIATED WITH THE REMEDY. FOR EXAMPLE, IN ORDER FOR THE REMEDY TO BE EFFECTIVE IN MAINTAINING THE HYDRAULIC BARRIER, IT MUST HAVE A CONSTANT SUPPLY OF UNCONTAMINATED WATER. MOREOVER, LANDFILL CLOSURE REQUIREMENTS MUST PROVIDE FOR THE COLLECTION AND TREATMENT OF LEACHATE-CONTAMINATED GROUNDWATER SO THAT IT WOULD RESULT IN AN PERMANENT SOLUTION THAT IS PROTECTIVE OF THE ENVIRONMENT.

COST

COST ESTIMATES WERE BASED ON PRESENTLY AVAILABLE DATA AND ARE DEPENDENT ON PARAMETERS SUCH AS LEACHATE CONTENT AND CONCENTRATION, SALINITY, AND VOLUME, IN ADDITION TO ACTUAL COST OF CWT CONSTRUCTION.

ALTERNATIVE 3 (RECOVERY WELLS/AIR STRIPPING) REPRESENTS THE LOWEST TOTAL PRESENT WORTH COST OF THE ALTERNATIVES AT \$6,166,000. THIS ALTERNATIVE ALSO REPRESENTS THE LOWEST CAPITAL COST AMONG THE ALTERNATIVES AT \$2,895,000. OPERATION AND MAINTENANCE (O&M) COSTS OVER A 15-YEAR PERIOD ARE ALSO THE LOWEST AMONG THE ALTERNATIVES EVALUATED WITH A PRESENT WORTH COST OF O&M OF \$3,271,000. ALTERNATIVE 2 (RECOVERY WELLS/CWT SYSTEM) WOULD REPRESENT THE NEXT LOWEST TOTAL PRESENT WORTH COST AT \$7,988,000. ALTERNATIVE 4 (POSITIVE INFILTRATION/BIOLOGICAL TREATMENT) REPRESENTS THE LEAST COST-EFFECTIVE ALTERNATIVE WITH A TOTAL PRESENT WORTH COST OF \$11,567,000. HOWEVER, AS DISCUSSED PREVIOUSLY, THE RESULTS FROM THE HYDROLOGIC STUDY MAY INDICATE THAT THE SCOPE OF ALTERNATIVE 4 WARRANTS MODIFICATION SUCH THAT THE REMEDY MAY BE AS, OR MORE, COST EFFECTIVE THAN THE OTHER TWO REMEDIAL ALTERNATIVES CONSIDERED. FURTHERMORE, DEPENDING ON THE SCOPE OF THE LANDFILL CLOSURE REQUIREMENTS IDENTIFIED BY FDER, ALTERNATIVE 4 MAY INCORPORATE ELEMENTS THAT WILL FULFILL SOME OF THE LANDFILL CLOSURE REQUIREMENTS AND POSSIBLY REDUCE THE TOTAL COSTS OF THE CERCLA RESPONSE AND LANDFILL CLOSURE ACTIONS.

STATE ACCEPTANCE

THE STATE OF FLORIDA, AS REPRESENTED BY FDER, HAS BEEN CONSULTED AND CONCURS WITH THE SELECTION OF THIS REMEDY. THE STATE CONCURRENCE LETTER IS INCLUDED IN THIS ROD AS APPENDIX E.

COMMUNITY ACCEPTANCE

BASED ON COMMENTS MADE BY CITIZENS AT THE PUBLIC MEETING HELD IN NORTH MIAMI ON MARCH 29, 1990 AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD, THERE WAS GENERAL CONCURRENCE THAT THE LEACHATE SHOULD BE INTERCEPTED AND TREATED TO REMOVE THE TOXICITY BEFORE IT EMERGES IN THE PRESERVE. FROM A TECHNICAL STANDPOINT, NO REAL PREFERENCE WAS INDICATED WITH REGARD TO THE BEST ALTERNATIVE TO ACCOMPLISH THIS TASK. COMMENTS PROVIDED BY THE CITIZENS DID INDICATE OPPOSITION TO SURFACE DISCHARGE OF THE TREATED EFFLUENT. CONCERN WAS ALSO EXPRESSED THAT THE LANDFILL PROPER PRESENTED A THREAT TO PUBLIC HEALTH AND SHOULD BE ADDRESSED IN THE REMEDIAL ACTION. A PRESENTATION OF ALL COMMENTS RECEIVED FROM THE GENERAL PUBLIC AND VARIOUS GOVERNMENT AGENCIES AND EPA'S RESPONSE TO THESE COMMENTS IS PROVIDED IN THE RESPONSIVENESS SUMMARY SECTION (APPENDIX B) OF THIS DOCUMENT.

#SR

SELECTED REMEDY

BASED ON A COMPREHENSIVE REVIEW OF CURRENTLY AVAILABLE DATA AND CAREFUL CONSIDERATION OF COMMENTS PROVIDED ON THE REMEDIAL ACTION ALTERNATIVES, EPA HAS DETERMINED THAT THE MOST APPROPRIATE METHOD OF REMEDIAL ACTION TO ABATE THE THREAT TO THE AQUATIC LIFE OF THE MANGROVE

PRESERVE IS TO INTERCEPT, COLLECT, AND TREAT THE LEACHATE-CONTAMINATED GROUNDWATER PRIOR TO ITS EMERGENCE INTO THE PRESERVE. THIS REMEDIAL APPROACH MAY BE ACCOMPLISHED THROUGH THE IMPLEMENTATION OF EITHER ALTERNATIVE 3 WHICH INCORPORATES A DEMONSTRATED TECHNOLOGY OR ALTERNATIVE 4 WHICH INCORPORATES AN INNOVATIVE TECHNOLOGY.

ALTERNATIVE 3 WILL PROVIDE FOR THE ABATEMENT OF THE ENVIRONMENTAL THREAT TO THE MANGROVE PRESERVE. IT WILL ACHIEVE SUBSTANTIAL RISK REDUCTION THROUGH THE INTERCEPTION, COLLECTION, AND TREATMENT OF LEACHATE-CONTAMINATED GROUNDWATER. IMPLEMENTATION OF THIS REMEDY WILL BE IN COMPLIANCE WITH ALL ARARS. BASED ON CURRENTLY AVAILABLE INFORMATION, ALTERNATIVE 3 REPRESENTS THE ALTERNATIVE WITH THE LOWEST PRESENT WORTH COST AND WILL BE THE MOST IMPLEMENTABLE. IT IS, THEREFORE, DETERMINED THAT ALTERNATIVE 3 WILL PROVIDE THE BEST BALANCE OF TRADE-OFFS AMONG ALTERNATIVES WITH RESPECT TO THE NINE EVALUATION CRITERIA. HOWEVER, AS DISCUSSED IN THE FOLLOWING, ALTERNATIVE 4 MAY ULTIMATELY PROVE TO BE AS, OR MORE, COST EFFECTIVE AND IMPLEMENTABLE THAN ALTERNATIVE 3 AFTER THE COLLECTION AND REVIEW OF ADDITIONAL HYDROLOGIC DATA.

THE REMEDIAL ACTION APPROACH CONTAINED IN ALTERNATIVE 4 IS SIMILAR TO ALTERNATIVE 3, WITH THE PRIMARY DIFFERENCE CENTERING AROUND THE METHOD USED TO EFFECT THE HYDRAULIC BARRIER. ALTERNATIVE 4 USES A TECHNOLOGY REFERRED TO AS POSITIVE INFILTRATION TO EFFECT THE HYDRAULIC BARRIER. EPA VIEWS THIS AS AN INNOVATIVE TECHNOLOGY WITH REGARD TO THE CONTROL OF RELEASES OF HAZARDOUS SUBSTANCES AT SUPERFUND SITES. SINCE EPA LACKS THE SITE-SPECIFIC HYDROLOGIC DATA TO DEFINITELY ASSESS THE APPROPRIATENESS OF THIS TECHNOLOGY AND SINCE THIS METHOD MAY BE ULTIMATELY BE MORE COST EFFECTIVE AND IMPLEMENTABLE THAN THE PROVEN TECHNOLOGY OF RECOVERY WELLS, EPA HAS DETERMINED THAT THIS INNOVATIVE TECHNOLOGY WARRANTS FURTHER CONSIDERATION AS A METHOD TO CONSTRUCT THE HYDRAULIC BARRIER.

PURSUANT TO THE NCP, SPECIFIC CRITERIA ARE PROVIDED FOR THE EVALUATION OF INNOVATIVE TECHNOLOGIES IN COMPARISON TO PROVEN TECHNOLOGY (55 FR 300.430(A)(1)(III)(E)). THE CRITERIA ENABLE EPA TO SELECT THE USE OF INNOVATIVE TECHNOLOGIES OVER DEMONSTRATED TECHNOLOGIES WHEN IT CAN BE SHOWN THAT THE INNOVATIVE TECHNOLOGY "OFFERS THE POTENTIAL FOR COMPARABLE OR SUPERIOR TREATMENT PERFORMANCE OR IMPLEMENTABILITY, FEWER OR LESSER IMPACTS THAN OTHER AVAILABLE APPROACHES, OR LOWER COSTS FOR SIMILAR LEVELS OF PERFORMANCE THAN DEMONSTRATED TECHNOLOGIES. HENCE, THE INNOVATIVE TECHNOLOGY WILL NOT BE APPROPRIATE IF THE RESULTS FROM THE HYDROLOGIC STUDY INDICATE THAT THE INNOVATIVE TECHNOLOGY DOES NOT ACHIEVE THE SAME LEVEL OF PERFORMANCE, IMPLEMENTABILITY, PROTECTION, OR COST EFFECTIVENESS AS THE DEMONSTRATED TECHNOLOGY.

ALTHOUGH TWO ACCEPTABLE TECHNOLOGIES EXIST AT THIS TIME REGARDING THE CONSTRUCTION OF A HYDRAULIC BARRIER, EPA DETERMINED THAT IT WOULD BE APPROPRIATE TO PROVIDE A DISCUSSION IN THE FOLLOWING SECTION THAT ADDRESSES THE REMAINING COMPONENTS (I.E., TREATMENT, EFFLUENT DISPOSAL) OF THE SELECTED REMEDY IN THE EVENT THAT THE DEMONSTRATED TECHNOLOGY (E.G., RECOVERY WELLS) IS DETERMINED TO BE THE MOST APPROPRIATE TECHNOLOGY FOR CONSTRUCTION OF THE HYDRAULIC BARRIER. HOWEVER, IF THE RESULTS OF THE HYDROLOGIC STUDY DEMONSTRATE THAT THE INNOVATIVE TECHNOLOGY (I.E., POSITIVE INFILTRATION) IS THE MOST APPROPRIATE METHOD TO CONSTRUCT THE HYDRAULIC BARRIER, THE OTHER COMPONENTS OF THE REMEDY MAY CHANGE ACCORDINGLY. THE OTHER COMPONENTS TO THE REMEDY SUCH AS TREATMENT AND DISPOSAL OF THE EFFLUENT WILL LIKELY BE THE SAME AS THAT PROVIDED IN THE DISCUSSION OF ALTERNATIVE 4 IN SECTION 8.2.4. HOWEVER, THE TREATMENT AND EFFLUENT DISPOSAL METHODS MAY BE MODIFIED BASED ON THE RESULTS OF THE HYDROLOGIC DESIGN STUDY.

AS PREVIOUSLY DISCUSSED, THE ACTUAL LOCATION AND SPECIFIC DESIGN OF THIS REMEDY WILL BE DETERMINED BASED ON SITE CONDITIONS DOCUMENTED DURING THE HYDROLOGIC STUDY. THE MOST APPROPRIATE LOCATION OF THE REMEDIAL ACTION WILL BE DETERMINED IN REMEDIAL DESIGN AND WILL BE SUBJECT TO REVIEW BY FDER. FURTHERMORE, THE DESIGN AND PLACEMENT OF THE REMEDIAL ACTION WILL BE DESIGNED TO MINIMIZE THE MIGRATION OF LEACHATE BEYOND THE "THE ZONE OF COMPLIANCE" PURSUANT TO STATE OF FLORIDA LANDFILL CLOSURE REGULATIONS. THE SELECTED REMEDY IS DISCUSSED BELOW IN TERMS OF THE SCOPE OF THE REMEDY, OPERATION AND MAINTENANCE, CLEANUP CRITERIA, AND ASSOCIATED ACTIONS.

SCOPE OF REMEDY

LEACHATE MIGRATING FROM THE LANDFILL TO THE SOUTHEAST WILL BE INTERCEPTED BY AN ARRAY OF RECOVERY WELLS CONSTRUCTED ALONG THE LANDFILL SIDE OF THE MANGROVE PRESERVE DIKE. USING CURRENTLY AVAILABLE DATA, IT WAS ESTIMATED THAT A TOTAL OF 17 WELLS WOULD EFFECTIVELY CAPTURE BOTH THE VERTICAL AND LATERAL EXTENT OF THE CONTAMINANT PLUME PROJECTED IN THE EPA RI. THE PROJECTED LATERAL EXTENT OF THE PLUME AS MODELED USING AMMONIA AS THE INDICATOR CHEMICAL IS SHOWN IN FIGURE 6. FIGURE 7 SHOWS THE TENTATIVE POSITIONING OF THE WELLS AS PROJECTED USING CONTAMINANT FATE AND TRANSPORT MODELING COMPUTER PROGRAMS. IT IS LIKELY THAT THE WELLS WILL HAVE TOTAL DEPTHS OF APPROXIMATELY 40 FEET BELOW LAND SURFACE (BLS) AND BE ESSENTIALLY SCREENED THROUGHOUT THE ENTIRE DEPTH TO ENSURE THAT THE LEACHATE IS ADEQUATELY INTERCEPTED. IN ORDER TO INTERCEPT THE LEACHATE, THE WELLS ARE EXPECTED TO WITHDRAW AN ESTIMATED 1.2 MGD. IT SHOULD BE NOTED, HOWEVER, THAT THE EXACT NUMBER, POSITION, DEPTH, SCREEN INTERVAL, AND PUMPING RATE OF THE WELLS WILL BE DEFINED ON THE BASIS OF THE DATA COLLECTED FROM A SITE-SPECIFIC HYDROLOGIC STUDY TO BE CONDUCTED DURING THE REMEDIAL DESIGN.

CONTAMINATED GROUNDWATER RECOVERED FROM THE WELLS WILL BE PUMPED TO THE TREATMENT SYSTEM LOCATED ON THE LANDFILL PROPER, THE EXACT LOCATION OF WHICH WILL BE SELECTED DURING THE REMEDIAL DESIGN PHASE OF THE PROJECT. MAJOR COMPONENTS OF THE TREATMENT SYSTEM INCLUDE A PH ADJUSTMENT TANK, AN AIR STRIPPING POND, AND A PH READJUSTMENT TANK. A SCHEMATIC DIAGRAM OF THE TREATMENT SYSTEM IS PROVIDED IN FIGURE 10. BASED ON ESTIMATES USING CURRENTLY AVAILABLE HYDROLOGIC DATA, IT IS ANTICIPATED THAT THE AIR STRIPPING POND WILL BE 4 TO 6 ACRES IN SIZE AND LINED WITH A COMPATIBLE MATERIAL TO PREVENT THE SEEPAGE OF WATER FROM THE POND INTO THE GROUND. THE PH OF THE INFLUENT TO THE TREATMENT SYSTEM WILL BE ADJUSTED CHEMICALLY TO BETWEEN 11.0 AND 11.5 TO MAXIMIZE THE REMOVAL OF THE AMMONIA. THE PH OF THE EFFLUENT FROM THE STRIPPING POND WILL THEN BE READJUSTED, IF NEEDED, PRIOR TO DISPOSAL. AS WITH THE PLACEMENT OF THE RECOVERY WELLS, THE SIZING OF THE VARIOUS TREATMENT COMPONENTS WILL BE BASED ON THE DATA COLLECTED FROM THE SITE-SPECIFIC HYDROLOGIC STUDY AND A TREATABILITY STUDY TO BE CONDUCTED PRIOR TO THE REMEDIAL DESIGN.

THE TREATED EFFLUENT WILL THEN BE PUMPED TO A SERIES OF SHALLOW SUBSURFACE TRENCHES CONSTRUCTED IN THE NORTHWEST SECTION OF THE LANDFILL OR TO NEARBY SURFACE WATERS FOR DISPOSAL. THE MOST APPROPRIATE METHOD FOR DISPOSAL OF THE EFFLUENT WILL BE SELECTED BASED ON THE RESULTS OF THE HYDROLOGIC AND TREATABILITY STUDIES CONDUCTED PRIOR TO REMEDIAL DESIGN. IF GROUNDWATER DISPOSAL IS DETERMINED APPROPRIATE, THE TREATED EFFLUENT WILL BE ALLOWED TO INFILTRATE THROUGH THE LANDFILL AND BACK INTO THE AQUIFER. THIS WILL POTENTIALLY ENHANCE THE TREATMENT PROCESS AND SHOULD NOT HAVE ANY ADVERSE EFFECTS ON THE GROUNDWATER NOR THE MICROBIAL ACTION WITHIN THE LANDFILL SINCE THE CONTAMINANTS WILL BE REMOVED DURING TREATMENT. MOREOVER, THE HIGH SULFIDE CONTENT NATURALLY OCCURRING IN MARINE ENVIRONMENTS IS SUCH THAT THE METALS POTENTIALLY PRESENT IN THE LANDFILL WILL BE BOUND IN A METALLIC PRECIPITATE AND RETAINED IN THE LANDFILL. THE SURFACE AREA REQUIRED FOR INFILTRATION OF THE EFFLUENT IS LESS THAN ONE PERCENT OF THE TOTAL LANDFILL AREA AND, AS SUCH, WILL LIKELY HAVE MINIMAL EFFECTS ON THE HYDROLOGY, LEACHATE GENERATION, OR MICROBIAL ACTION OF THE LANDFILL.

BASED ON CURRENTLY AVAILABLE DATA, GROUNDWATER DISPOSAL IS A FEASIBLE APPROACH. THE EXACT METHOD OF DISCHARGE (LAKES OR SUBTERRANEAN TRENCHES) WILL BE SELECTED BASED ON THE RESULTS OF THE SITE-SPECIFIC HYDROLOGIC STUDY. HOWEVER, IF THE RESULTS FROM THE HYDROLOGIC AND TREATABILITY STUDIES DEMONSTRATE THAT DISCHARGE TO NEARBY SURFACE WATERS SUCH AS THE HYDROLOGICALLY ALTERED WETLANDS OR THE SOUTHERN CANAL IS MORE APPROPRIATE, THE TREATED NON-TOXIC EFFLUENT WILL BE DISCHARGED TO SURFACE WATER. THE EFFLUENT WILL BE MONITORED AND, IF NECESSARY, TREATED FURTHER PRIOR TO DISCHARGE TO ENSURE THAT ARARS ARE MET.

OPERATION AND MAINTENANCE OF REMEDY

THE O&M WILL INCLUDE THE MONITORING OF SYSTEM CONTROLS TO ENSURE THAT THE SYSTEM IS OPERATING

PROPERLY. THE ROUTINE O&M PROCEDURE WOULD REQUIRE THAT AN OPERATOR BE PRESENT ONSITE PERIODICALLY TO MONITOR THE PERFORMANCE OF THE RECOVERY, AERATION, AND DISCHARGE SYSTEM COMPONENTS. EFFICIENT OPERATION OF AN AIR STRIPPING SYSTEM REQUIRES PERIODIC CLEANING OR REPLACEMENT OF SYSTEM COMPONENTS (SUCH AS THE SPRAY IRRIGATION HEADS) TO AVOID ACCUMULATED BIOLOGICAL GROWTH OR PRECIPITATED MATTER THAT COULD CLOG THE SYSTEM AND REDUCE EFFICIENCY. PERIODIC MONITORING OF THE GROUNDWATER AND SURFACE WATER AS DESCRIBED IN SECTION 10.3 WILL ALSO BE REQUIRED AS PART OF THE O&M OF THE REMEDIAL ACTION. TO DOCUMENT THAT THE GROUNDWATER RECOVERY, TREATMENT, AND DISPOSAL SYSTEM IS OPERATED AND MAINTAINED PROPERLY, AN O&M LOG WILL BE MAINTAINED THROUGHOUT THE PERIOD OF THE REMEDIAL ACTION AND MADE AVAILABLE TO EPA FOR PERIODIC REVIEW.

A PRELIMINARY COST ANALYSIS FOR THE CONSTRUCTION AND O&M OF THE REMEDIAL ACTION, AS CURRENTLY DESIGNED, IS PROVIDED IN TABLE 7. AS DISCUSSED EARLIER, AS A RESULT OF THE DATA PROVIDED FROM THE SITE-SPECIFIC HYDROLOGIC AND TREATABILITY STUDIES, MODIFICATIONS TO THE CONCEPTUAL DESIGN MAY BE REQUIRED. THESE MODIFICATIONS WILL BE MADE BY EPA, AFTER CONSULTATION WITH OTHER FEDERAL, STATE AND LOCAL AGENCIES. THE PUBLIC WILL ALSO BE NOTIFIED OF ANY SIGNIFICANT CHANGES TO THE REMEDIAL DESIGN. THIS COST BREAKDOWN DOES NOT INCLUDE THE COST ASSOCIATED WITH THE REQUIRED MONITORING AS DEFINED IN THE CLEANUP GOALS SECTION. BASED ON HISTORICAL INFORMATION REGARDING THE AMOUNT OF TIME REQUIRED FOR ORGANIC REFUSE IN SANITARY LANDFILLS TO DECOMPOSE, IT IS ESTIMATED THAT THE GROUNDWATER RECOVERY, TREATMENT, AND DISPOSAL SYSTEM MAY HAVE TO OPERATE FOR A PERIOD OF 15 TO 25 YEARS; COST ESTIMATES, HOWEVER, WERE BASED ON 15 YEARS OF O&M.

CLEANUP CRITERIA FOR SELECTED REMEDY

THE EFFECTIVENESS OF THE REMEDIAL ACTION DURING THE PERIOD OF OPERATION WILL BE MEASURED ON THE BASIS OF TOXICITY AND OTHER CHEMICAL AND PHYSICAL INDICATORS. THREE SEPARATE PROTOCOLS, AS DISCUSSED BELOW, WILL BE USED TO MEASURE THE EFFECTIVENESS OF THE HYDRAULIC BARRIER AND THE TREATMENT SYSTEM AND TO DETERMINE THE POINT AT WHICH THE REMEDIAL ACTION IS COMPLETE.

HYDRAULIC BARRIER

BASED ON HYDROLOGIC PRINCIPLES AND AVAILABLE HYDROLOGIC DATA, THE GROUNDWATER RECOVERY SYSTEM WILL PRODUCE A HYDRAULIC BARRIER TO GROUNDWATER MOVEMENT. THIS SHOULD EFFECTIVELY INTERCEPT LEACHATE THAT MIGRATES THROUGH THE LANDFILL THAT IS WITH IN THE CONE OF INFLUENCE OF THE RECOVERY WELL SYSTEM. THIS BASIS, HOWEVER, WOULD BE VALIDATED BY THE MEASUREMENT OF VARIOUS CHEMICAL AND PHYSICAL PARAMETERS.

CHEMICAL PARAMETERS WILL INCLUDE UN-IONIZED AMMONIA AND TOTAL CHLORIDES IN SURFACE WATER SAMPLES COLLECTED FROM VARIOUS LOCATIONS WITHIN THE MANGROVE PRESERVE AND BISCAYNE BAY. SINCE LEACHATE-CONTAMINATED GROUNDWATER MIGRATING FROM THE LANDFILL IS CONTAMINATED BY SIGNIFICANTLY ELEVATED LEVELS OF UN-IONIZED AMMONIA, THE HYDRAULIC BARRIER SHOULD EFFECTIVELY INTERCEPT THIS CONTAMINATED GROUNDWATER AND RESULT IN A SIGNIFICANT DECREASE IN THE CONCENTRATION OF UN-IONIZED AMMONIA IN THE SURFACE WATER SAMPLES COLLECTED FROM THE PRESERVE. IF THE HYDRAULIC BARRIER IS EFFECTIVELY INTERCEPTING THE LEACHATE, CONCENTRATIONS OF UN-IONIZED AMMONIA PRESENT IN SURFACE WATER SAMPLES COLLECTED FROM THE PRESERVE SHOULD BE COMPARABLE TO THOSE FROM BISCAYNE BAY.

A SECOND CHEMICAL MEASUREMENT WILL BE BASED ON A GRADIENT OF TOTAL CHLORIDES PRESENT IN SAMPLES COLLECTED FROM THE GROUNDWATER RECOVERY SYSTEM AND SURFACE WATER COLLECTED FROM THE MANGROVE PRESERVE AND BISCAYNE BAY. SINCE THE HYDRAULIC BARRIER SHOULD EFFECTIVELY REMOVE ANY INPUT OF FRESHWATER (LOWER TOTAL CHLORIDES) INTO THE MANGROVE PRESERVE, THE CONCENTRATION OF TOTAL CHLORIDES SHOULD INCREASE TO A LEVEL COMPARABLE TO THAT OF BISCAYNE BAY. THIS WOULD BE EXPECTED SINCE THE BAY HAS A HIGHER CONCENTRATION OF TOTAL CHLORIDES AND WOULD BE THE PRIMARY INFLUENCE ON THE CONCENTRATION OF CHLORIDES PRESENT IN THE MANGROVE PRESERVE.

ANOTHER METHOD OF JUDGING EFFECTIVENESS OF THE HYDRAULIC BARRIER WILL BE BASED ON PHYSICAL MEASUREMENTS OF GROUNDWATER LEVELS AND GROUNDWATER MODELING OF THE DATA. A BASELINE WILL BE ESTABLISHED PRIOR TO IMPLEMENTATION OF THE HYDRAULIC BARRIER. MEASUREMENTS WILL BE MADE PERIODICALLY THEREAFTER TO EVALUATE THE EFFECTIVENESS OF THE HYDRAULIC BARRIER.

PHYSICAL AND CHEMICAL PARAMETERS WILL BE MEASURED PERIODICALLY TO VALIDATE THE EFFECTIVENESS OF THE HYDRAULIC BARRIER. THE FREQUENCY OF THESE MEASUREMENTS WILL BE BASED ON THE EFFECTIVENESS OF THE HYDRAULIC BARRIER AND WILL LIKELY DECREASE WITH TIME. IT IS ANTICIPATED THAT MEASUREMENTS WILL BE MADE ON A QUARTERLY BASIS DURING THE FIRST TWO YEARS OF OPERATION TO CALIBRATE THE SYSTEM. ASSUMING THAT THE BARRIER IS EFFECTIVELY INTERCEPTING THE LEACHATE-CONTAMINATED GROUNDWATER MIGRATING INTO THE MANGROVE PRESERVE, THE MONITORING INTERVAL WILL BE INCREASED TO A SEMI-ANNUAL FREQUENCY. IT IS ANTICIPATED THAT THIS MONITORING FREQUENCY WILL BE MAINTAINED FOR AN ADDITIONAL FIVE YEARS OF OPERATION, AND THEN INCREASED TO AN ANNUAL MONITORING FREQUENCY FOR THE DURATION OF THE REMEDIAL ACTION, ASSUMING THAT THE SYSTEM IS STILL FULFILLING ITS DESIGN OBJECTIVE. IF THE DATA COLLECTED FROM ANY OF THESE PERIODS OF MONITORING INDICATE THAT THE SYSTEM IS NOT EFFECTIVELY CAPTURING THE LEACHATE-CONTAMINATED GROUNDWATER PRIOR TO ITS EMERGENCE TO THE MANGROVE PRESERVE, A CONTINGENCY PLAN WILL BE IMPLEMENTED TO FURTHER EVALUATE THE EFFECTIVENESS OF THE HYDRAULIC BARRIER AND TO DETERMINE THE NEED FOR DESIGN MODIFICATIONS.

THIS CONTINGENCY PLAN WILL CONSIST OF MONTHLY MONITORING OF THE THREE INDICATOR PARAMETERS. THIS MONITORING WILL BE CONDUCTED FOR FOUR CONSECUTIVE MONTHS. THE RESULTING DATA WILL BE USED TO ASSESS THE EFFECTIVENESS OF THE HYDRAULIC BARRIER AND TO DETERMINE WHAT ACTIONS ARE NEEDED, IF ANY, TO MODIFY THE DESIGN OF THE GROUNDWATER RECOVERY SYSTEM.

THE DETERMINATION THAT MODIFICATIONS TO THE DESIGN ARE WARRANTED WILL BE MADE BY EPA, IN CONSULTATION WITH STATE AND LOCAL GOVERNMENTS. THE PUBLIC WILL BE NOTIFIED OF ANY MODIFICATIONS TO THE DESIGN OF THE GROUNDWATER RECOVERY SYSTEM THAT SIGNIFICANTLY ALTERED THE ORIGINAL OBJECTIVE OF THE SYSTEM. ONCE THE DETERMINATION HAD BEEN MADE BY EPA AS TO THE APPROPRIATE ACTIONS TO BE UNDERTAKEN REGARDING THE PERFORMANCE OF THE GROUNDWATER RECOVERY SYSTEM, THE MONITORING PLAN AS PREVIOUSLY DISCUSSED WILL RESUME.

TREATMENT SYSTEM

THE EFFECTIVENESS OF THE TREATMENT SYSTEM IN REMOVING THE TOXICITY FROM THE LEACHATE-CONTAMINATED GROUNDWATER WILL BE MONITORED THROUGHOUT THE DURATION OF THE REMEDIAL ACTION. THE SUCCESS OF THE TREATMENT SYSTEM WILL BE BASED ON A COMPARISON OF TWO INDICATOR PARAMETERS MEASURED USING THE INFLUENT TO AND EFFLUENT FROM THE TREATMENT SYSTEM. THESE PARAMETERS WILL INCLUDE TOXICITY AND UN-IONIZED AMMONIA.

TOXICITY TESTS WILL BE CONDUCTED PERIODICALLY USING A WATER SAMPLE COLLECTED FROM THE INFLUENT TO THE TREATMENT SYSTEM AND THE EFFLUENT FROM THE SYSTEM AFTER TREATMENT. THE RESULT SHOULD BE A SIGNIFICANT REDUCTION IN TOXICITY FOR THE EFFLUENT SAMPLE. ALTHOUGH A "NO TOXICITY" LEVEL IN THE EFFLUENT SAMPLE WOULD BE DESIRABLE, THE AGENCY REALIZES THAT THIS MAY NOT BE TECHNICALLY FEASIBLE, ESPECIALLY DURING THE START-UP AND CALIBRATION OF THE SYSTEM. A LEVEL OF "NO APPARENT TOXICITY" (AS DEFINED LATER) SHOULD BE ACHIEVED WITH TIME AS THE GROUNDWATER IS REMEDIATED AND THE TOXIC COMPONENTS OF THE LEACHATE-CONTAMINATED GROUNDWATER ARE REMOVED.

TO ENSURE THAT THE MAXIMUM DEGREE OF PROTECTION FOR THE ENVIRONMENT IS ACHIEVED THROUGH THIS TREATMENT SYSTEM, AQUATIC ORGANISMS THAT EXPERIENCED THE MOST SEVERE TOXIC EFFECTS DURING THE EPA WATER QUALITY AND TOXIC ASSESSMENT STUDY WILL BE USED IN THE TOXICITY TESTS. THESE ORGANISMS INCLUDE A MARINE RED MACROALGAE CHAMPIA PARVULA AND A SMALL MARINE FISH MENIDIA BERYLLINA. TOXICITY TESTS IN WHICH CHAMPIA ARE USED WILL BE BASED ON CHRONIC EXPOSURE WHILE TOXICITY TESTS USING MENIDIA WILL BE BASED ON ACUTE EXPOSURE. THE FREQUENCY AT WHICH THESE

TESTS WILL BE CONDUCTED WILL BE THE SAME AS PREVIOUSLY OUTLINED FOR THE MONITORING OF THE HYDRAULIC BARRIER. IT IS ANTICIPATED THAT THESE TEST ORGANISMS WILL BE COMPATIBLE WITH THE SALINITY RANGE OF THE GROUNDWATER COLLECTED FOR THESE TESTS. IF NOT COMPATIBLE, EPA WILL SPECIFY ANOTHER TEST SPECIES THAT WOULD BE EXPECTED TO REPRESENT A SIMILAR DEGREE OF SENSITIVITY TO CONTAMINATION BUT IS MORE TOLERANT OF THE SALINITY RANGE OF THE TEST MEDIUM.

A SECOND INDICATOR USED TO EVALUATE THE EFFECTIVENESS OF THE TREATMENT SYSTEM WILL BE A CONCENTRATION DIFFERENTIAL FOR UN-IONIZED AMMONIA IN SAMPLES COLLECTED FROM THE INFLUENT TO AND EFFLUENT FROM THE TREATMENT SYSTEM. SINCE THE PRIMARY COMPONENT OF THE LEACHATE'S TOXICITY HAS BEEN SHOWN TO BE UN-IONIZED AMMONIA, A SIGNIFICANT REDUCTION IN THE CONCENTRATION OF UN-IONIZED AMMONIA SHOULD BE A FAVORABLE INDICATION THAT THE TREATMENT SYSTEM IS EFFECTIVELY REDUCING THE TOXICITY OF THE CONTAMINATED GROUNDWATER. MONITORING OF THE INFLUENT TO AND EFFLUENT FROM THE TREATMENT SYSTEM WILL FOLLOW THE SAME REGIMEN AS ESTABLISHED FOR THE TOXICITY TESTS AND THE HYDRAULIC BARRIER.

IN THE EVENT THAT A SIGNIFICANT REDUCTION IN THE TOXICITY IS NOT OBSERVED, IN EITHER THE TOXICITY TESTS OR MEASUREMENT OF UN-IONIZED AMMONIA, THE SAME TYPE OF CONTINGENCY PLAN AS DESCRIBED IN THE DISCUSSION FOR THE HYDRAULIC BARRIER WOULD BE IMPLEMENTED. THIS WOULD INCLUDE MONTHLY MONITORING FOR A PERIOD OF FOUR MONTHS. EPA WOULD THEN REVIEW THE DATA, EVALUATE THE TREATMENT SYSTEM, AND DETERMINE WHETHER OR NOT MODIFICATIONS TO THE SYSTEM DESIGN OR EVALUATION CRITERIA ARE WARRANTED. EPA WOULD THEN DETERMINE THE APPROPRIATE ACTIONS TO BE UNDERTAKEN REGARDING THE PERFORMANCE OF THE GROUNDWATER TREATMENT SYSTEM, AND THE MONITORING PLAN AS PREVIOUSLY DISCUSSED WOULD RESUME.

END-POINT CRITERIA

THE PRIMARY OBJECTIVE OF THIS REMEDIAL ACTION IS TO ABATE THE TOXIC EFFECTS ON AQUATIC LIFE IN THE MANGROVE PRESERVE THAT ARE RESULTING FROM THE RELEASE OF LEACHATE-CONTAMINATED GROUNDWATER FROM THE MUNISPORT LANDFILL. BECAUSE THE MOST SEVERE TOXIC EFFECTS WERE OBSERVED AT LOW TIDE, A POINT AT WHICH DILUTION EFFECTS FROM BISCAYNE BAY ARE MINIMIZED, IT WAS CONCLUDED THAT THE LEACHATE-CONTAMINATED GROUNDWATER SURFACING IN THE MANGROVE PRESERVE IS THE MOST SIGNIFICANT ELEMENT CONTRIBUTING TO THE TOXICITY IN THE PRESERVE. AS A RESULT, EPA HAS DETERMINED THAT A LEVEL OF "NO APPARENT TOXICITY" FOR THE GROUNDWATER THAT IS SURFACING IN THE MANGROVE PRESERVE MUST BE ACHIEVED. THE COMPLETE REMOVAL OF THE TOXICITY FROM THE LEACHATE-CONTAMINATED GROUNDWATER IS NECESSARY IN ORDER TO PROTECT THE AQUATIC LIFE PRESENT IN THE MANGROVE PRESERVE DURING ALL TIDAL STAGES. ONCE A LEVEL OF "NO APPARENT TOXICITY" IS ACHIEVED FOR THE LEACHATE-CONTAMINATED GROUNDWATER, THE REMEDIAL ACTION FOR THIS SITE WILL BE JUDGED COMPLETE.

MONITORING FOR THE END-POINT OF THE REMEDIAL ACTION WILL BE BASED ON TOXICITY TESTS CONDUCTED USING WATER SAMPLES COLLECTED FROM THE GROUNDWATER RECOVERY SYSTEM (BEFORE GROUNDWATER ENTERS THE TREATMENT SYSTEM). AS WITH THE TOXICITY TESTS FOR THE TREATMENT SYSTEM MONITORING, THE AQUATIC ORGANISMS DETERMINED TO BE THE MOST SENSITIVE TO THE LEACHATE (I.E., CHAMPIA PARVUAL, MENIDIA BERYLLINA) WILL BE USED IN THE TOXICITY TESTS. TOXICITY TESTS IN WHICH CHAMPIA IS USED WILL BE BASED ON CHRONIC EXPOSURE WHILE TOXICITY TESTS USING MENIDIA WILL BE BASED ON ACUTE EXPOSURE.

TOXICITY TESTS WILL BE CONDUCTED ON A SEMI-ANNUAL BASIS THROUGHOUT THE PERFORMANCE OF THE REMEDIAL ACTION. AS DISCUSSED EARLIER, THE REMEDIAL ACTION WILL BE JUDGED COMPLETE ONCE A LEVEL OF "NO APPARENT TOXICITY" IS ACHIEVED. EPA RECOGNIZES THE VARIATION IN SURVIVAL OF TEST ORGANISMS AMONG CONTROL SAMPLES; THIS VARIATION IS, THEREFORE, REFLECTED IN THE FOLLOWING DEFINITIONS FOR "NO APPARENT TOXICITY" WITH REGARD TO ACUTE AND CHRONIC TOXICITY TESTS. FOR ACUTE TOXICITY TESTS, "NO APPARENT TOXICITY" IS DEFINED AS TEST RESULTS THAT HAVE AN AVERAGE MORTALITY OF NO MORE THAN 10 PERCENT. WITH REGARD TO CHRONIC TESTS, "NO APPARENT TOXICITY" IS DEFINED AS AN AVERAGE MORTALITY OF NO MORE THAN 20 PERCENT, RELATIVE TO THE AVERAGE PERCENT

MORTALITY OF TEST CONTROLS.

ONCE NO TOXIC EFFECTS ARE OBSERVED, FOR BOTH TEST SPECIES, FOR AT LEAST FOUR CONSECUTIVE MONITORING INTERVALS (I.E., 24 MONTHS), THE HYDRAULIC BARRIER AND GROUNDWATER TREATMENT SYSTEM WILL BE SHUT DOWN. A LONG-TERM MONITORING PROGRAM WILL THEN BE INSTITUTED FOR THE GROUNDWATER. THIS PROGRAM WILL INCLUDE ANNUAL TOXICITY TESTS USING GROUNDWATER SAMPLES COLLECTED FROM THE GROUNDWATER RECOVERY SYSTEM AND THE SAME TWO AQUATIC ORGANISMS. THE ANNUAL MONITORING WILL BE CONDUCTED FOR A PERIOD OF FIVE YEARS, AT WHICH POINT EPA WILL EVALUATE THE COMPLETENESS OF THE REMEDIAL ACTION. THE AGENCY WILL THEN MAKE A DETERMINATION WHETHER OR NOT ADDITIONAL LONG-TERM MONITORING IS WARRANTED OR THAT THE REMEDIAL ACTION IS COMPLETE AND THEREBY INITIATE THE NPL DELETION PROCESS FOR THE SITE. IF TOXIC EFFECTS ARE OBSERVED DURING THE LONG-TERM MONITORING, THE TOXICITY TEST WILL BE REPLICATED. IF THE EFFECTS ARE STILL OBSERVED, EPA WILL DETERMINE WHETHER OR NOT TO RE-START THE GROUNDWATER RECOVERY AND TREATMENT SYSTEM OR CONTINUE THE LONG-TERM MONITORING. THE NPL DELETION PROCESS WILL NOT BE INITIATED UNTIL EPA HAS DETERMINED THAT THE CLEANUP CRITERIA IN THIS ROD HAVE BEEN SATISFACTORILY MET.

IF THE GROUNDWATER RECOVERY AND TREATMENT SYSTEM HAS BEEN OPERATED FOR A SUFFICIENT PERIOD OF TIME, SUCH THAT IT IS APPARENT THAT A MAXIMUM DEGREE OF TOXICITY REDUCTION IN THE GROUNDWATER HAS BEEN ACHIEVED AND THAT ANY ADDITIONAL REDUCTION IN TOXICITY IS TECHNICALLY INFEASIBLE, EPA MAY ELECT TO MODIFY THE END-POINT CRITERIA. THIS MAY INCLUDE THE IDENTIFICATION OF AN ACCEPTABLE LEVEL OF TOXICITY IN THE GROUNDWATER OR THE USE OF THE EPA SALTWATER QUALITY STANDARD FOR UN-IONIZED AMMONIA TO ESTABLISH THE END-POINT CRITERIA. CONVERSELY, IF AT ANY POINT DURING THE REMEDIAL ACTION THE EPA DETERMINES THAT THE CLEANUP CRITERIA ARE NOT PROVIDING FOR ADEQUATE PROTECTION OF THE ENVIRONMENT, THE AGENCY MAY ELECT TO MAKE MODIFICATIONS TO THE CRITERIA TO ENSURE THAT THE REMEDIAL ACTION WILL RESULT IN ADEQUATE PROTECTION OF THE ENVIRONMENT. THESE MODIFICATIONS TO THE END-POINT CRITERIA WILL BE MADE IN CONSULTATION WITH STATE AND LOCAL GOVERNMENTS. THE PUBLIC WILL ALSO BE NOTIFIED OF ANY MODIFICATIONS TO THE END-POINT CRITERIA.

CLOSURE OF THE LANDFILL PROPER WILL BE CONDUCTED UNDER STATE AUTHORITY IN ACCORDANCE WITH FAC, CHAPTER 17-701. THE CLOSURE WILL PROCEED CONCURRENTLY WITH THE CERCLA ACTION AND EPA WILL CONSULT WITH FDER ON THE REQUIREMENTS FOR CLOSURE TO ENSURE THAT THE TWO ACTIONS ARE COMPATIBLE. AS DISCUSSED PREVIOUSLY IN SECTION 2.1 OF THIS DOCUMENT, THE SITE OR FACILITY TO BE ADDRESSED BY THIS SUPERFUND REMEDIAL ACTION IS THE OF RELEASE OF HAZARDOUS SUBSTANCES INTO THE MANGROVE PRESERVE AND THAT PARCEL OF LAND (APPROXIMATELY 30 ACRES) ON THE LANDFILL PROPER NEEDED TO CONSTRUCT THE REMEDIAL ACTION. THAT PORTION OF THE LANDFILL NOT INCLUDED IN THE SUPERFUND REMEDIAL ACTION (APPROXIMATELY 140 ACRES) AND THE REMAINING PARCEL OF LAND ON WHICH THE LANDFILL IS LOCATED ARE NOT INCLUDED IN THE "RELEASE" OR "SITE" TO BE ADDRESSED UNDER THIS ROD. HOWEVER, SHOULD IT BE DETERMINED AS A RESULT OF THE HYDROLOGIC STUDY THAT MORE AREA IS NEEDED TO PERFORM THE CERCLA REMEDY, THE CERCLA RESPONSE ACTION WILL BE EXPANDED AS APPROPRIATE.

ASSOCIATED ACTIONS

CONCURRENTLY WITH THE CONSTRUCTION OF THE RECOVERY WELL AND TREATMENT SYSTEM, HYDROLOGIC IMPROVEMENTS WILL BE MADE TO THE MANGROVE PRESERVE AND THE HYDROLOGICALLY ALTERED WETLANDS WEST AND NORTH OF THE MANGROVE PRESERVE (FIGURE 11). THE HYDROLOGIC IMPROVEMENTS TO THE MANGROVE PRESERVE WILL BE ACCOMPLISHED BY RESTORING THE FULL (100 PERCENT) TIDAL CONNECTION BETWEEN BISCAYNE BAY AND THE PRESERVE. THE EPA MANGROVE PRESERVE SHOWED THAT THE TWO CULVERTS (EAST AND WEST CULVERTS) CONNECTING THE PRESERVE WITH BISCAYNE BAY WERE INADEQUATELY SIZED AND REDUCED THE FLOW OF WATER INTO THE MANGROVE PRESERVE BY AS MUCH AS 40 PERCENT. AS PART OF THE HYDROLOGIC DESIGN STUDY, THE DEGREE BY WHICH THE TIDAL CONNECTION BETWEEN THE BAY AND PRESERVE HAS DIMINISHED WILL BE STUDIED FURTHER TO DETERMINE THE BEST METHOD FOR RESTORING THE CONNECTION. POSSIBLE METHODS FOR RESTORING THE FULL TIDAL CONNECTION INCLUDE ENLARGING THE EXISTING CULVERTS, ADDING ADDITIONAL CULVERTS, OR REMOVING THE CULVERTS AND EXPANDING THE CONNECTION TO THAT OF THE ORIGINAL DRAINAGE CANAL SIZE, OR PROVIDING ADDITIONAL TIDAL CONNECTION WITH BISCAYNE

BAY.

WITH REGARD TO HYDROLOGIC IMPROVEMENTS TO THE HYDROLOGICALLY ALTERED WETLANDS, THE DIKE SEPARATING THE ALTERED WETLANDS FROM THE MANGROVE PRESERVE WILL BE BREACHED IN STRATEGIC PLACES TO RESTORE THE FULL (100 PERCENT) TIDAL CONNECTION WITH THE PRESERVE AND BISCAYNE BAY. THE TIMING AND LOCATION OF THESE BREACHES WILL BE DEPENDENT ON THE EFFECT THIS WATER MAY HAVE ON THE GROUNDWATER RECOVERY SYSTEM LOCATED IN THE SOUTHERN SECTION OF THE HYDROLOGICALLY ALTERED WETLANDS. AS PART OF THE SITE-SPECIFIC HYDROLOGIC STUDY, POTENTIAL EFFECTS THAT THE FLOODING OF THE HYDROLOGICALLY ALTERED WETLANDS MAY HAVE ON THE RECOVERY SYSTEM WILL BE EVALUATED. THE METHOD AND TIMING OF THE HYDROLOGIC IMPROVEMENTS TO THE HYDROLOGICALLY ALTERED WETLANDS WILL BE BASED ON THE RESULTS OF THE HYDROLOGIC STUDY. BASED ON THE RESULTS OF THIS STUDY, EPA, IN CONSULTATION WITH STATE AND LOCAL AGENCIES, WILL DETERMINE THE SCOPE OF HYDROLOGIC IMPROVEMENTS TO BE MADE TO THE ALTERED WETLANDS.

STATUTORY DETERMINATIONS

THE EPA HAS DETERMINED THAT THE SELECTED REMEDY WILL SATISFY THE STATUTORY REQUIREMENTS OF SECTION 121 OF CERCLA. THE REMEDY WILL BE PROTECTIVE OF THE ENVIRONMENT, ATTAIN ARARS, BE COST-EFFECTIVE, AND WILL UTILIZE PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. NO SHORT-TERM RISKS OR CROSS-MEDIA IMPACTS WILL BE CAUSED BY IMPLEMENTATION OF THIS REMEDY. FINALLY, IMPLEMENTATION OF THIS REMEDY WILL COMPLY WITH THE CERCLA, SECTION 121(B)(1), PREFERENCE FOR TREATMENT.

PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT

THE SELECTED REMEDY WILL PROVIDE ADEQUATE PROTECTION OF THE ENVIRONMENT THROUGH THE INTERCEPTION, COLLECTION, AND TREATMENT OF LEACHATE-CONTAMINATED GROUNDWATER PRIOR TO ITS EMERGENCE IN THE MANGROVE PRESERVE. TREATMENT OF THE LEACHATE WILL REMOVE THE TOXICITY, THUS REDUCING RISKS TO THE ENVIRONMENT. THE RESULTS FROM THE RI/FS HAVE DEMONSTRATED THAT THE SITE DOES NOT REPRESENT A SIGNIFICANT THREAT TO HUMAN HEALTH OR WELFARE.

AS DISCUSSED PREVIOUSLY, ONE OF THE CRITERIA FOR SELECTING THE INNOVATIVE TECHNOLOGY (I.E., POSITIVE INFILTRATION) OVER THE DEMONSTRATED TECHNOLOGY (I.E., RECOVERY WELLS) TO EFFECT THE HYDRAULIC BARRIER IS THAT THE INNOVATIVE TECHNOLOGY MUST PROVIDE A COMPARABLE LEVEL OF PROTECTION TO THE DEMONSTRATED TECHNOLOGY. HENCE, IF THE SELECTED REMEDY INCORPORATES THE INNOVATIVE TECHNOLOGY AS THE MOST APPROPRIATE TECHNOLOGY, IT WILL PROVIDE THE SAME LEVEL OF PROTECTION TO THE ENVIRONMENT AS THE DEMONSTRATED TECHNOLOGY.

ATTAINMENT OF ARARS

IMPLEMENTATION OF THE REMEDY AS PRESENTLY DEFINED IN WHICH THE HYDRAULIC BARRIER WILL BE ACCOMPLISHED USING THE DEMONSTRATED TECHNOLOGY AND IN WHICH DISPOSAL OF THE TREATED EFFLUENT WILL BE THROUGH THE DISCHARGE TO THE AQUIFER THROUGH THE INFILTRATION OF EFFLUENT THROUGH SUBSURFACE TRENCHES WILL COMPLY WITH ALL ARARS AND OTHER ENVIRONMENTAL CRITERIA OR POLICIES "TO BE CONSIDERED" (TBC). AS DISCUSSED PREVIOUSLY, COMPARABLE LEVELS OF PERFORMANCE AND PROTECTIVENESS TO THE DEMONSTRATED TECHNOLOGY MUST BE MET BY THE INNOVATIVE TECHNOLOGY. FOR THE INNOVATIVE TECHNOLOGY TO BE SELECTED IT MUST MEET ALL ARARS. FOR THE PURPOSES OF REVIEW AND ASSURANCE OF COMPLIANCE OF ARARS, ARARS ASSOCIATED WITH THE CERCLA REMEDIAL ACTION IN WHICH THE DEMONSTRATED TECHNOLOGY (I.E., RECOVERY WELLS) IS USED IS DISCUSSED IN THE FOLLOWING.

PURSUANT TO FAC CHAPTER 373, USE OF AN AQUIFER MUST BE REASONABLE AND BENEFICIAL AND NOT RESULT IN ANY ADVERSE IMPACT ON OTHER USERS OF THE AQUIFER. SFWMD HAS EXPRESSED CONCERN THAT THE DISCHARGE OF THE POTENTIALLY SALINE EFFLUENT ON THE UPPER PORTION OF THE AQUIFER MAY HAVE AN ADVERSE EFFECT ON THE AQUIFER IN THE FORM OF ADDITIONAL SALTWATER INTRUSION. EPA HAS CONSIDERED

THIS CONCERN AND HAS DETERMINED THAT NO ADVERSE LONG-TERMS EFFECTS WILL OCCUR FOR SEVERAL REASONS. FIRST, THE AREA OF INFILTRATION OF EFFLUENT BACK INTO THE AQUIFER IS WELL SEAWARD OF THE ZONE OF SALTWATER INTRUSION CURRENTLY DEFINED BY THE US GEOLOGICAL SURVEY. MOREOVER, THIS PORTION OF THE BISCAYNE AQUIFER IS CLASSIFIED BY FDER AS A CLASS G-III AQUIFER (FAC CHAPTER 17-3.401), WHICH MEANS THAT IT IS NOT SUITABLE FOR POTABLE PURPOSES. MOREOVER, THE DEGREE OF SALTWATER INTRUSION IS CONTROLLED BY THE ELABORATE NETWORK OF CANALS THAT SERVE TO MAINTAIN A HIGHER INLAND HYDRAULIC HEAD. AS SUCH, CHANGES WITH RESPECT TO THE REGIONAL HYDROLOGY ARE NOT ANTICIPATED. FINALLY, TO CONFIRM EPA'S DETERMINATION, THE IMPACT OF THE REMEDIAL ACTION ON THE REGIONAL HYDROLOGY WILL BE FURTHER EVALUATED USING DATA COLLECTED FROM THE HYDROLOGIC STUDY. THIS WILL ENSURE THAT EPA'S REMEDY WILL MEET ALL ENVIRONMENTAL REGULATIONS THAT ARE EITHER APPLICABLE OR RELEVANT AND APPROPRIATE.

IN THE EVENT THAT THE RESULTS FROM THE SITE-SPECIFIC HYDROLOGIC STUDY INDICATE THAT DISCHARGE OF THE TREATED EFFLUENT TO SURFACE WATER IS APPROPRIATE, THERE ARE SEVERAL OTHER ENVIRONMENTAL LAWS TO BE CONSIDERED. THE SURFACE WATERS OF THE MANGROVE PRESERVE AND ADJOINING WATERS ARE CLASSIFIED AS CLASS III, (FAC 17-3.121) AND, AS SUCH, THERE ARE CERTAIN CRITERIA THAT MUST BE MET WITH REGARD TO THE DISCHARGE. THESE CRITERIA NOT ONLY ESTABLISH NUMERICAL LIMITS FOR VARIOUS CONTAMINANTS IN THE EFFLUENT BUT ALSO TOXICITY CRITERIA THAT MUST BE MET. MOREOVER, THE MANGROVE PRESERVE IS PART OF THE BISCAYNE BAY AQUATIC PRESERVE FOR WHICH OUTSTANDING FLORIDA WATER QUALITY CRITERIA APPLY. THIS ESSENTIALLY MEANS THAT CONTAMINANTS PRESENT IN DISCHARGES TO THE PRESERVE MUST BE AT CONCENTRATIONS AT OR BELOW BACKGROUND. FINALLY, FEDERAL AMBIENT WATER QUALITY CRITERIA ALSO APPLY TO DISCHARGES TO SURFACE WATERS OF OR CONTIGUOUS WITH THE MANGROVE PRESERVE. THE CRITERIA ASSOCIATED WITH THESE STATE AND FEDERAL ENVIRONMENTAL LAWS ARE DETERMINED TO BE RELEVANT AND APPROPRIATE AND WILL BE COMPLIED WITH IF EFFLUENT FROM THE TREATMENT PROCESS IS DISCHARGED TO THE MANGROVE PRESERVE OR OTHER ADJACENT SURFACE WATERS.

PURSUANT TO SECTION 402 OF THE CWA, EFFLUENT DISCHARGES FROM TREATMENT SYSTEMS ARE REQUIRED TO BE PERMITTED UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PROGRAM. ALTHOUGH SECTION 121(E)(1) OF CERCLA EXEMPTS EPA FROM THE REQUIREMENT TO SECURE NPDES PERMITS FOR SUPERFUND SITES, THE REMEDIAL ACTION IS REQUIRED TO COMPLY WITH THE SUBSTANTIVE REQUIREMENTS OF THE NPDES PROGRAM. THESE REQUIREMENTS INCLUDE BOTH NUMERIC AND NARRATIVE CRITERIA AGAINST WHICH THE EFFLUENT MUST BE MONITORED. SINCE THERE ARE SEVERAL ENVIRONMENTAL STATUTES THAT APPLY TO SURFACE DISCHARGE OF EFFLUENT FROM THE TREATMENT SYSTEM, MANY OF WHICH OVERLAP WITH REGARD TO CRITERIA, THE MOST STRINGENT CRITERIA WILL BE USED TO MONITOR THE EFFLUENT.

IN ADDITION TO FEDERAL AND STATE WATER QUALITY CRITERIA, DADE COUNTY HAS ESTABLISHED CRITERIA (I.E., TBC) FOR THE PROTECTION OF SURFACE WATER RESOURCES. HOWEVER, GIVEN THE STRINGENT REQUIREMENTS PROVIDED FOR IN FEDERAL AND STATE ENVIRONMENTAL STATUTES, THE INTENT OF THE COUNTY CRITERIA WILL BE COMPLIED WITH, ALTHOUGH THE ACTUAL CRITERIA WILL NOT BE INCLUDED IN THE MONITORING CRITERIA. FINALLY, AS PART OF THE DADE COUNTY WELLFIELD PROTECTION PLAN, NO NET LOSS OF WATER FROM THE BISCAYNE AQUIFER IS MANDATED TO HELP MAINTAIN SUFFICIENT POTENTIOMETRIC PRESSURE IN THE AQUIFER IN ORDER TO PREVENT SALTWATER INTRUSION. IMPLEMENTATION OF THIS REMEDY, IN WHICH EFFLUENT FROM THE TREATMENT PROCESS MAY BE DISCHARGED TO SURFACE WATER, WOULD NOT COMPLY WITH THE WELLFIELD PROTECTION PLAN.

COST-EFFECTIVENESS

ALTERNATIVE 3, THE SELECTED ALTERNATIVE, IS THE MOST COST-EFFECTIVE REMEDY ANALYZED IN TERMS OF CAPITAL, O&M, AND TOTAL PRESENT WORTH COSTS. THE TOTAL PRESENT WORTH COST IS \$6,166,000. EPA HAS DETERMINED THAT THE SELECTED REMEDY IS PROPORTIONATE TO THE OVERALL EFFECTIVENESS AND IS A REASONABLE VALUE FOR THE MONEY.

AS DISCUSSED PREVIOUSLY, ONE OF THE CRITERIA FOR SELECTING THE INNOVATIVE TECHNOLOGY (I.E., POSITIVE INFILTRATION) WITH REGARD TO THE IMPLEMENTATION OF THE HYDRAULIC BARRIER IS THAT IT BE

COMPARABLE AS COST EFFECTIVENESS AS THE DEMONSTRATED TECHNOLOGY (I.E., RECOVERY WELLS). HENCE, IF THE INNOVATIVE TECHNOLOGY IS SELECTED, THERE WILL BE ESSENTIALLY NO DIFFERENCE IN COST EFFECTIVENESS.

11.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT (OR RESOURCE RECOVERY) TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

THE SELECTED REMEDY USES PERMANENT SOLUTIONS AND TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. BY INTERCEPTING, COLLECTING, AND TREATING THE LEACHATE-CONTAMINATED GROUNDWATER, THE TOXICITY, MOBILITY, AND VOLUME OF CONTAMINANTS WILL BE SIGNIFICANTLY REDUCED BOTH IN THE SHORT AND LONG-TERM. AS DISCUSSED PREVIOUSLY, ONE OF THE CRITERIA FOR SELECTING THE INNOVATIVE TECHNOLOGY OVER THE DEMONSTRATED TECHNOLOGY IS A COMPARABLE LEVEL OF PERFORMANCE WITH THE DEMONSTRATED TECHNOLOGY. SELECTION OF THE INNOVATIVE TECHNOLOGY WILL BE EVIDENCE THAT THE REMEDY HAS BEEN REVIEWED AND DETERMINED THAT IMPLEMENTATION OF THE REMEDY USING THE INNOVATIVE TECHNOLOGY WILL ACHIEVE THE SAME DEGREE OF PERMANENCE AND USE OF ALTERNATE TREATMENT TECHNOLOGIES AS THE DEMONSTRATED TECHNOLOGY.

FINALLY, THE EXPECTED DURATION OF THE REMEDIAL ACTION WILL BE BETWEEN 15 AND 20 YEARS, AFTER WHICH THE THREAT TO THE AQUATIC ORGANISMS SHOULD BE PERMANENTLY ABATED. FURTHERMORE, THIS IS THE MOST COST-EFFECTIVE REMEDY.

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

THE STATUTORY PREFERENCE FOR TREATMENT WILL BE MET SINCE A PRINCIPAL ELEMENT OF THE REMEDIAL ACTION IS TO ACTIVELY TREAT THE CONTAMINATED GROUNDWATER THROUGH AIR STRIPPING TO REMOVE THE TOXICITY. RISKS TO THE ENVIRONMENT WILL BE MITIGATED THROUGH THE IMPLEMENTATION OF THIS REMEDY. THIS WILL APPLY WHETHER THE METHOD USED TO EFFECT THE HYDRAULIC BARRIER IS THE INNOVATIVE OR DEMONSTRATED TECHNOLOGY.

DOCUMENTATION OF SIGNIFICANT CHANGES

SHORTLY AFTER THE PUBLIC MEETING EPA RECEIVED A DRAFT OF THE TAC REPORT WHICH CONTAINED A RECOMMENDATION CONCERNING A METHOD FOR PERFORMING THE CERCLA REMEDIAL ACTION AND CLOSURE OF THE LANDFILL. AFTER REVIEW OF THE TAC REPORT AND CONSULTATION WITH FDER, EPA DETERMINED THAT THE TAC REPORT CONTAINS ELEMENTS THAT WARRANT FURTHER CONSIDERATION AND POSSIBLE INCORPORATION INTO THE SELECTED REMEDY. AS PREVIOUSLY DISCUSSED, THE TAC REPORT RECOMMENDED THE USE OF A POSITIVE INFILTRATION HYDRAULIC BARRIER TO INTERCEPT THE LEACHATE-CONTAMINATED GROUNDWATER. ALTHOUGH EPA'S PROPOSED PLAN RECOMMENDED THE USE OF NEGATIVE PRESSURE (E.G., RECOVERY WELLS) TO EFFECT THE HYDRAULIC BARRIER, EPA, IN CONSULTATION WITH FDER HAS DETERMINED THAT THE POSITIVE PRESSURE TECHNOLOGY IS FEASIBLE AND WARRANTS FURTHER CONSIDERATION.

EPA WILL CARRY BOTH METHODS FORWARD THROUGH THE HYDROLOGIC STUDY AS OPTIONS IN THE SELECTED REMEDY. AS DISCUSSED PREVIOUSLY, EPA CONSIDERS THE POSITIVE INFILTRATION TECHNOLOGY AN INNOVATIVE TECHNOLOGY NOT TYPICALLY USED FOR THE CONTROL OF RELEASES OF HAZARDOUS SUBSTANCES AT SUPERFUND SITES. THEREFORE, EPA WILL EVALUATE THE INNOVATIVE TECHNOLOGY USING THE CRITERIA SET FORTH IN THE NCP. THE PERFORMANCE, IMPLEMENTABILITY, PROTECTIVENESS, AND COST EFFECTIVENESS WILL BE MEASURED AGAINST THAT OF THE DEMONSTRATED TECHNOLOGY. A COMPARABLE DEGREE OF EACH OF THESE CRITERIA MUST BE ACHIEVED BEFORE THE INNOVATIVE TECHNOLOGY CAN BE SELECTED.

#RS

RESPONSIVENESS SUMMARY

OVERVIEW

THE US ENVIRONMENTAL PROTECTION AGENCY (EPA) COMPLETED A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS) FOR THE MUNISPORT PROPERTY LOCATED IN NORTH MIAMI, FLORIDA. DURING THE RI, INFORMATION WAS GATHERED ON THE NATURE AND EXTENT OF CONTAMINATION, AND, AS PART OF THE FS, ALTERNATIVES FOR REMEDIAL ACTION (RA) WERE DEVELOPED AND EVALUATED. THE RI/FS IDENTIFIED NO SIGNIFICANT PUBLIC HEALTH THREAT POSED BY THE LANDFILL; HOWEVER, THE INFORMATION REGARDING THE POTENTIAL ENVIRONMENTAL THREAT WAS INCONCLUSIVE. AT THE CONCLUSION OF THE FS, EPA PREPARED A PROPOSED PLAN FOR REMEDIAL ACTION TO RESPOND TO THE POTENTIAL ENVIRONMENTAL THREAT. THE JULY 1988 PROPOSED PLAN RECOMMENDED CERCLA REMEDIAL ACTION THAT INCLUDED LANDFILL CLOSURE IN ACCORDANCE WITH FLORIDA LAW.

AFTER FURTHER REVIEW OF THE DATA, EPA CONCLUDED THAT NO SIGNIFICANT THREAT TO THE ENVIRONMENT EXISTED AND ISSUED A NOTICE OF CHANGE TO THE PROPOSED PLAN IN NOVEMBER 1988 STATING THAT NO CERCLA ACTION WOULD BE TAKEN AT MUNISPORT AND THE LANDFILL WOULD BE CLOSED UNDER STATE AUTHORITY. THIS COURSE OF ACTION WAS OPPOSED BY SOME MEMBERS OF THE PUBLIC, ENVIRONMENTAL GROUPS, THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA), AND THE US FISH AND WILDLIFE SERVICE DUE TO THE POTENTIAL THREAT TO THE ENVIRONMENT.

IN 1989, EPA, IN RESPONSE TO THESE COMMENTS, CONDUCTED A WATER QUALITY AND TOXIC ASSESSMENT STUDY AT THE MANGROVE PRESERVE ADJACENT TO THE LANDFILL. ACCORDING TO THIS STUDY, "THE EMERGENCE OF TOXIC LEACHATE IN THE FLORIDA STATE MANGROVE PRESERVE WILL REMAIN A LONG-TERM PROBLEM OF WATER QUALITY. THE TOXICITY ASSOCIATED WITH THE LANDFILL LEACHATE WILL SEVERELY IMPAIR THE ECOLOGICAL FUNCTION OF THE PRESERVE AND PRECLUDE THE DEVELOPMENT AND MAINTENANCE OF A BALANCED COMMUNITY OF AQUATIC BIOTA." THE STUDY RECOMMENDED THAT ACTION BE TAKEN TO CONTROL THE DISPERSION OF LEACHATE FROM THE LANDFILL AND PRECLUDE ITS EMERGENCE INTO THE SURFACE WATERS IN THE MANGROVE PRESERVE.

AS A RESULT OF THE WATER QUALITY AND TOXIC ASSESSMENT STUDY, EPA CONCLUDED THAT A RELEASE OF HAZARDOUS SUBSTANCES TO THE ENVIRONMENT HAS OCCURRED AND POSES A SIGNIFICANT THREAT TO AQUATIC LIFE IN THE PRESERVE. PURSUANT TO SECTION 104 OF THE COMPREHENSIVE, ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA), AS AMENDED BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA), EPA DETERMINED THAT REMEDIAL ACTION IS WARRANTED TO ABATE THIS THREAT. EPA PREPARED A PROPOSED PLAN DATED MARCH 1990 THAT IDENTIFIES ALTERNATIVES FOR REMEDIATING THE ENVIRONMENTAL THREAT TO THE MANGROVE PRESERVE.

POTENTIAL ALTERNATIVES TO REMEDIATE THE ENVIRONMENTAL THREAT TO THE MANGROVE PRESERVE WERE INITIALLY IDENTIFIED BY THE MUNISPORT TECHNICAL ADVISORY COMMITTEE (TAC) IN CONJUNCTION WITH THE FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION (FDER) AND EPA. THESE PRELIMINARY ALTERNATIVES WERE FURTHER EVALUATED BY EPA BASED ON NINE CRITERIA FOUND IN EPA GUIDANCE DOCUMENTS, INCLUDING CONSIDERATIONS SUCH AS FEASIBILITY, IMPLEMENTABILITY, COST, AND STATUTORY REQUIREMENTS. AS A RESULT, SEVERAL OF THE PRELIMINARY ALTERNATIVES WERE DETERMINED NOT TO BE APPROPRIATE AND WERE SUBSEQUENTLY NOT INCLUDED IN THE PROPOSED PLAN. A TOTAL OF THREE VIABLE ALTERNATIVES, IN ADDITION TO A "NO ACTION" ALTERNATIVE WERE INCLUDED IN THE PROPOSED PLAN.

THE REMEDIAL ACTION ALTERNATIVES INCLUDE THE INTERCEPTION OF LEACHATE-CONTAMINATED GROUNDWATER MIGRATING FROM THE LANDFILL TO THE PRESERVE USING A HYDRAULIC BARRIER IN CONJUNCTION WITH RECOVERY AND TREATMENT OF THE LEACHATE-CONTAMINATED GROUNDWATER. METHODS OF GROUNDWATER TREATMENT INCLUDE BIOLOGICAL, MECHANICAL, OR BOTH. DISPOSAL OPTIONS FOR TREATED GROUNDWATER INCLUDE DISCHARGES TO SURFACE WATER OR GROUNDWATER. THE SELECTED REMEDY ALSO INCLUDES HYDRAULIC IMPROVEMENTS TO THE MANGROVE PRESERVE. THIS WILL ASSIST IN MITIGATING THE EFFECTS OF THE

LEACHATE ON AQUATIC LIFE THAT INHABITS THE PRESERVE. SINCE THE PROPOSED REMEDY WOULD NOT RECOVER CONTAMINANTS ALREADY PRESENT IN THE PRESERVE, IMPROVEMENTS TO THE TIDAL CONNECTION BETWEEN THE BISCAYNE BAY AND THE PRESERVE ARE EXPECTED TO LESSEN THE IMPACT ON AQUATIC ORGANISMS.

THE PROPOSED PLAN PRESENTED FOUR ALTERNATIVES FOR ADDRESSING THE LEACHATE-CONTAMINATED GROUNDWATER AT THE MUNISPORT PROPERTY. ALTERNATIVE 1 WAS FOR NO ACTION. THE SUPERFUND PROGRAM REQUIRES THAT THE "NO ACTION" ALTERNATIVE BE EVALUATED AT EVERY SITE TO ESTABLISH A BASELINE FOR COMPARISON. THIS ALTERNATIVE WOULD INCLUDE ANNUAL MONITORING OF THE SITE BUT NO FURTHER REMEDIAL ACTION. UNDER THIS ALTERNATIVE, LEACHATE WOULD CONTINUE TO BE RELEASED AND AQUATIC ORGANISMS WOULD CONTINUE TO BE ADVERSELY AFFECTED.

ALTERNATIVE 2 INCLUDES LEACHATE COLLECTION FOLLOWED BY MECHANICAL PRE-TREATMENT AND BIOLOGICAL TREATMENT IN CONSTRUCTED WETLANDS. LEACHATE MIGRATING FROM THE LANDFILL TO THE SOUTHEAST WOULD BE INTERCEPTED BY APPROXIMATELY 17 RECOVERY WELLS. TREATMENT WOULD INCLUDE BOTH MECHANICAL AND BIOLOGICAL PROCESSES. MECHANICAL TREATMENT WOULD BE BY AIR STRIPPING AND BIOLOGICAL TREATMENT WOULD BE CONDUCTED IN A CONSTRUCTED WETLANDS TREATMENT SYSTEM.

ALTERNATIVE 3 WOULD USE AIR STRIPPING FOR REMOVAL OF AMMONIA FOLLOWED BY DISCHARGE OF TREATED GROUNDWATER TO SURFACE OR GROUND-WATER. THIS ALTERNATIVE INCLUDES THE SAME LEACHATE INTERCEPTION METHOD AS ALTERNATIVE 2, OR POSSIBLY A POSITIVE HYDRAULIC BARRIER IF THE HYDROLOGIC STUDY INDICATES THAT IT IS APPROPRIATE. TREATING THE AMMONIA WITH AIR STRIPPING TOWERS ALONE IS NOT AN EFFICIENT TREATMENT IN THIS CASE DUE TO THE POTENTIAL FOULING OF THE AIR STRIPPING TOWERS. AIR STRIPPING IN A POND REQUIRING THREE TO FOUR ACRES IS FEASIBLE AND POTENTIALLY MORE EFFECTIVE. EFFLUENT FROM THE TREATMENT SYSTEM WOULD BE USED TO PROVIDE ENHANCED FLUSHING OF THE LANDFILL.

ALTERNATIVE 4 WOULD UTILIZE A POSITIVE HYDRAULIC BARRIER WITH LANDFILL LEACHATE COLLECTION AND TREATMENT. THE HYDRAULIC BARRIER WOULD BE CREATED ALONG THE LANDFILL SIDE OF THE MANGROVE PRESERVE BY CONSTRUCTING A DIKE AND OPEN TRENCH AND CONTINUALLY PUMPING FRESH WATER INTO THE TRENCH. THE WATER IN THE TRENCH WOULD BE MAINTAINED AT A HIGHER ELEVATION THAN THE WATER LEVEL IN THE PRESERVE AND BISCAYNE BAY. THIS WOULD PREVENT THE MIGRATION OF CONTAMINATED GROUNDWATER INTO THE PRESERVE. TREATMENT OF THE CONTAMINATED GROUNDWATER WOULD BE SIMILAR TO ALTERNATIVE 3.

EPA'S PREFERRED ALTERNATIVE FOR ABATING THE ENVIRONMENTAL TREAT TO AQUATIC ORGANISMS IN THE STATE MANGROVE PRESERVE IS ALTERNATIVE 3, CONSISTING OF LEACHATE INTERCEPTION AND COLLECTION, TREATMENT BY AIR STRIPPING, AND DISCHARGE TO GROUNDWATER OR SURFACE WATER. THIS ALTERNATIVE BEST FULFILLS THE NINE CRITERIA THAT EPA USES TO EVALUATE REMEDIAL ALTERNATIVES. THESE CRITERIA ARE SPECIFIED IN THE EPA DOCUMENT GUIDANCE FOR CONDUCTING REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDIES UNDER CERCLA, INTERIM FINAL, OCTOBER 1988 (OSWER DIRECTIVE 9355.3-01). THE CRITERIA WERE DEVELOPED BASED ON THE STATUTORY REQUIREMENT SPECIFIED IN SECTION 121 OF CERCLA. THE NINE CRITERIA ARE AS FOLLOWS:

- OVERALL PROTECTION,
- COMPLIANCE WITH ARARS,
- LONG-TERM EFFECTIVENESS AND PERMANENCE,
- REDUCTION OF TOXICITY, MOBILITY, OR VOLUME OF THE CONTAMINANTS THROUGH TREATMENT
- SHORT-TERM EFFECTIVENESS
- IMPLEMENTABILITY
- COST
- STATE ACCEPTANCE
- COMMUNITY ACCEPTANCE

IN ADDITION, THE USE OF A POSITIVE HYDRAULIC BARRIER IN LIEU OF INTERCEPTION WELLS WILL BE

ASSESSED BASED ON INFORMATION GENERATED DURING HYDROLOGIC AND HYDROGEOLOGIC TESTING AT THE SITE. THE INFORMATION, ALONG WITH DATA GENERATED DURING WATER QUALITY ANALYSES, WILL BE USED TO CONFIRM OR REFINE THE SELECTED ALTERNATIVE. A TREATABILITY TEST WILL ALSO BE CONDUCTED TO EVALUATE THE SELECTED ALTERNATIVE'S EFFECTIVENESS IN TREATING THE LEACHATE AND THE IMPACT OF THE REMEDIAL ACTION ON THE ENVIRONMENT. THE SITE THAT WILL BE SUBJECT TO THE CERCLA REMEDIAL ACTION WILL BE THE LEACHATE PLUME EMANATING FROM THE LANDFILL AND PORTIONS OF THE LANDFILL NECESSARY FOR THE IMPLEMENTATION OF GROUNDWATER RECOVERY AND TREATMENT. THE LANDFILL WILL BE CLOSED UNDER STATE AUTHORITY.

PUBLIC PARTICIPATION IN SUPERFUND PROJECTS IS REQUIRED IN THE NATIONAL OIL AND HAZARDOUS SUBSTANCES CONTINGENCY PLAN (NCP). COMMENTS RECEIVED FROM THE PUBLIC ARE CONSIDERED IN THE SELECTION OF REMEDIAL ACTIONS FOR SITES. THIS RESPONSIVENESS SUMMARY SUMMARIZES THE COMMENTS RECEIVED DURING THIS PROJECT. THIS DOCUMENT IS ORGANIZED TO ADDRESS THE COMMENTS REGARDING THE JULY 1988 PROPOSED PLAN, THE NOVEMBER 1988 NOTICE OF CHANGE TO THE PROPOSED PLAN, AND THE MARCH 1990 PROPOSED PLAN SEPARATELY. PART I OF SECTION 3 OF THE RESPONSIVENESS SUMMARY ADDRESSES LOCAL COMMUNITY COMMENTS OF THOSE PEOPLE WHO HAVE IDENTIFIED THEMSELVES AS LIVING IN THE IMMEDIATE VICINITY OF THE SITE. PART II WILL BE A COMPREHENSIVE RESPONSE TO SIGNIFICANT COMMENTS. EACH PART HAS BEEN DIVIDED ACCORDING TO THE MAJOR SUBJECT. THOSE INDIVIDUALS OR GROUPS PROVIDING COMMENTS HAVE BEEN IDENTIFIED.

IN GENERAL, THE PUBLIC AND ENVIRONMENTAL GROUPS FAVORED EPA INVOLVEMENT IN THE CERCLA REMEDIAL ACTION AND SUPPORTED THE PREFERRED ALTERNATIVE. SIGNIFICANT DISCUSSION, HOWEVER, WAS DOCUMENTED REGARDING THE TYPES OF CONTAMINATION AT THE SITE, THE LEVEL OF CONTAMINATION, AND THE THREAT TO PUBLIC HEALTH AND THE ENVIRONMENT. WITH REGARD TO THE TYPES OF CONTAMINATION, RESIDENTS, CONCERNED CITIZENS, AND ENVIRONMENTAL GROUPS QUESTIONED WHETHER ASBESTOS, PETROLEUM PRODUCTS, RAW SEWAGE, MEDICAL WASTES, HEAVY METALS, PESTICIDES, PCBS, AND OTHER ORGANICS WERE PRESENT AT THE SITE. THERE WERE A SIGNIFICANT NUMBER OF COMMENTS RELATED TO THE PRESENCE OF THESE CHEMICALS.

A REVIEW OF DISPOSAL RECORDS INDICATES THAT THE PROPERTY WAS ESSENTIALLY OPERATED AS A SOLID WASTE LANDFILL. AT THIS TIME, EPA HAS FOUND NO EVIDENCE THAT HAZARDOUS WASTE WAS DISPOSED AT THE SITE. THIS DETERMINATION IS FURTHER SUPPORTED BY DATA COLLECTED FROM THE NUMEROUS SAMPLING INVESTIGATIONS, INCLUDING ANALYSES OF SOIL, GROUNDWATER, SEDIMENT, AND SURFACE WATER WHICH SHOW NO EVIDENCE OF SIGNIFICANT CONTAMINATION.

ALTHOUGH NUMEROUS ORGANIC AND INORGANIC COMPOUNDS HAVE BEEN DETECTED AMONG THE SAMPLES, THE DATA SET, WHEN REVIEWED AS A WHOLE, INDICATES THAT THE SUBSTANCES DETECTED ARE INDICATIVE OF MATERIALS ASSOCIATED WITH COMMON HOUSEHOLD WASTES. THE SUBSTANCES DETECTED AND THEIR RESPECTIVE CONCENTRATIONS ARE NOT INDICATIVE OF A HAZARDOUS WASTE SITE.

DURING THE 1988 RI/FS, A VARIETY OF ORGANIC AND INORGANIC CHEMICALS WERE DETECTED IN THE GROUNDWATER. MOST OF THESE, HOWEVER, WERE DETECTED AT LOW CONCENTRATIONS WITH A FEW OF THE CHEMICALS EXCEEDING FEDERAL AND STATE WATER QUALITY STANDARDS. SINCE THE GROUNDWATER IN THE VICINITY OF THE SITE IS NOT USED FOR POTABLE PURPOSES, IT WAS DETERMINED THAT THE CONTAMINANTS IN THE GROUNDWATER PRESENT NO RISK TO PUBLIC HEALTH.

WITH REGARD TO METALS, WATER AND SEDIMENT SAMPLES ANALYZED FOR METALS INDICATE THAT THE METALS DETECTED WERE AT LEVELS COMMENSURATE WITH MOST MARINE SYSTEMS AND ARE PROBABLY NOT CAUSED BY LEACHATE AT THIS TIME. THE CONCENTRATIONS OF THESE METALS MAY VARY BASED ON THE AMOUNT OF RAINFALL DEPENDING ON WHETHER THE MATERIAL WAS BURIED ABOVE OR BELOW THE WATER TABLE.

PCBS WERE DETECTED AT A FEW LOCATIONS. BASED ON THIS INFREQUENT DETECTION AND RELATIVELY LOW CONCENTRATIONS, EPA DETERMINED THAT PCBS DO NOT PRESENT A SIGNIFICANT THREAT TO THE PUBLIC OR THE ENVIRONMENT.

ANALYSES OF SURFACE WATER AND SEDIMENT SAMPLES INDICATE LOW-LEVEL CONTAMINATION BY A VARIETY OF MOSTLY INORGANIC CHEMICALS TYPICAL OF A NONHAZARDOUS WASTE LANDFILL. CONCENTRATIONS FOR SEVERAL OF THESE CHEMICALS EXCEEDED APPLICABLE WATER QUALITY STANDARDS AMONG THE SAMPLES COLLECTED. ANALYSES OF SOIL SAMPLES INDICATED THE PRESENCE OF CHEMICALS TYPICALLY ASSOCIATED WITH NONHAZARDOUS MUNICIPAL LANDFILLS. SAMPLES COLLECTED FROM UNFILLED AREAS INDICATED LITTLE CONTAMINATION. SAMPLES COLLECTED FROM THE LANDFILL SURFACE AND NORTHEAST PORTION OF THE LANDFILL CONTAINED SEVERAL CONTAMINANTS AT CONCENTRATIONS ABOVE BACKGROUND.

THE RISK ASSESSMENT CONTAINED IN THE RI/FS ALSO EXAMINED OTHER EXPOSURE PATHWAYS FOR THIS SITE. BASED ON THE RESULTS OF THIS STUDY, HOWEVER, THE AGENCY CONCLUDED THAT A SIGNIFICANT THREAT TO PUBLIC HEALTH OR WELFARE DID NOT EXIST. HOWEVER, THE DETERMINATION OF THE THREAT TO THE ENVIRONMENT WAS INCONCLUSIVE. PUBLIC PARTICIPATION, AS WAS STATED EARLIER, CAUSED EPA TO LOOK CLOSER AT THE THREAT TO AQUATIC LIFE IN THE MANGROVE PRESERVE. THE RESULTS OF THAT STUDY CONCLUSIVELY DEMONSTRATED A SIGNIFICANT THREAT TO THE ENVIRONMENT POSED BY LEACHATE FROM THE LANDFILL.

SECTION 2

BACKGROUND ON COMMUNITY INVOLVEMENT

THE MUNISPORT LANDFILL IS AN INACTIVE SOLID WASTE LANDFILL LOCATED WITHIN A 291-ACRE TRACT IN NORTHEASTERN DADE COUNTY. LANDFILLING ACTIVITIES ENCOMPASSED APPROXIMATELY 170 ACRES. LANDFILLING ACTIVITIES BEGAN IN THE MID-1960S WHEN A FEW ACRES OF LAND WERE USED TO DISPOSE OF UNKNOWN TYPES OF WASTES. IN THE EARLY 1970S THE CITY OF NORTH MIAMI LEASED THE 291 ACRES OF LAND TO MUNISPORT, INC. FOR THE DEVELOPMENT OF A RECREATIONAL FACILITY. MUNISPORT BEGAN FILLING LOW LYING AREAS WITH CONSTRUCTION DEBRIS AND OTHER SOLID WASTES.

THE FLORIDA DEPARTMENT OF POLLUTION CONTROL (FDPC) GRANTED A TEMPORARY OPERATING PERMIT IN 1975 TO ALLOW MUNISPORT TO FILL PORTIONS OF THE LANDFILL WITH SOLID WASTE ABOVE THE WATER TABLE. IN 1976, MUNISPORT RECEIVED A "CLEAN FILL" PERMIT TO FILL WETLANDS, AND AN EXTENSION TO THE TEMPORARY OPERATING PERMIT TO CONTINUE SOLID WASTE DISPOSAL. THE SITE WAS EVALUATED BY EPA IN 1982 USING THE HAZARD RANKING SYSTEM AND RECEIVED A SCORE OF 32.37. AS A RESULT, EPA PROPOSED THE MUNISPORT LANDFILL FOR INCLUSION ON THE NATIONAL PRIORITIES LIST (NPL) IN THE DECEMBER 30, 1982 FEDERAL REGISTER. THE LANDFILL WAS FINALIZED ON THE NPL IN SEPTEMBER 1983.

THE CITY OF NORTH MIAMI PETITIONED EPA TO DELIST THE SITE FROM NPL IN 1986; HOWEVER, EPA DETERMINED DELISTING WAS INAPPROPRIATE AT THAT TIME AND THAT AN RI/FS WAS NECESSARY TO EVALUATE THE THREAT TO THE PUBLIC AND THE ENVIRONMENT. THE RI/FS DID NOT IDENTIFY A SIGNIFICANT PUBLIC HEALTH THREAT, HOWEVER, FINDINGS REGARDING THE ENVIRONMENTAL THREAT WERE INCONCLUSIVE. EPA ISSUED ITS PROPOSED PLAN IN JULY 1988 RECOMMENDING CLOSURE OF THE LANDFILL BASED ON THE POTENTIAL ENVIRONMENTAL THREAT POSED BY THE LANDFILL. THE NOTICE OF AVAILABILITY OF THESE DOCUMENTS WAS PUBLISHED IN THE MIAMI HERALD ON JULY 24, 1988. A PUBLIC COMMENT PERIOD WAS HELD FROM JULY 20, 1988, THROUGH AUGUST 17, 1988. A PUBLIC MEETING WAS HELD ON JULY 27, 1988. THE COMMENTS RECEIVED AT THE MEETING AND DURING THE MONTH FOLLOWING THE MEETING EXPRESSED THE FOLLOWING CONCERNS:

- SOME CITIZENS AND INTEREST GROUPS INDICATED THAT THE LANDFILL SHOULD BE INCLUDED ON THE NPL.
- SOME CITIZENS INDICATED THAT THE LANDFILL POSED NO THREAT AND THE CITY SHOULD CONTINUE TO SEEK DELISTING.
- THE RELIABILITY OF CURRENT LANDFILL CLOSURE PLANS AND TECHNOLOGIES WERE QUESTIONED.
- THE SOURCE OF FUNDING FOR THE REMEDIAL ACTION WAS QUESTIONED.

IN NOVEMBER 1988, EPA, AFTER FURTHER REVIEW AND EVALUATION OF THE RI/FS DATA, ISSUED A NOTICE OF CHANGE TO THE PROPOSED PLAN (MIAMI HERALD, NOVEMBER 27, 1988) IN WHICH THE "NO ACTION" ALTERNATIVE WAS RECOMMENDED BECAUSE EPA HAD DETERMINED THERE WAS NO SIGNIFICANT THREAT TO THE ENVIRONMENT. THIS NOTICE WAS PUBLISHED IN THE MIAMI HERALD ON NOVEMBER 27, 1988, EXPLAINING THAT NO REMEDIAL ACTION "UNDER CERCLA" WAS APPROPRIATE. HOWEVER, EPA STILL RECOMMENDED THAT LANDFILL CLOSURE BY THE STATE UNDER STATE LAW WAS APPROPRIATE. SOME MEMBERS OF THE PUBLIC, ENVIRONMENTAL GROUPS, THE NOAA, AND THE US FISH AND WILDLIFE SERVICE OPPOSED THE CHANGE DUE TO THE POTENTIAL ENVIRONMENTAL THREAT.

EPA ADDRESSED THESE PUBLIC COMMENTS BY CONDUCTING THE WATER QUALITY AND TOXIC ASSESSMENT STUDY IN 1989 AT THE MANGROVE PRESERVE ADJACENT TO THE LANDFILL. THE STUDY RECOMMENDED THAT ACTION BE TAKEN TO CONTROL THE DISPERSION OF LEACHATE FROM THE LANDFILL AND PRECLUDE ITS EMERGENCE INTO THE SURFACE WATERS IN THE MANGROVE PRESERVE. AS A RESULT, EPA PUBLISHED ITS PROPOSED PLAN IN MARCH 1990 WHICH EVALUATED ALTERNATIVES FOR TREATING LEACHATE MIGRATING TO THE MANGROVE PRESERVE. THESE DOCUMENTS WERE MADE AVAILABLE IN THE ADMINISTRATIVE RECORD FILE AND INFORMATION REPOSITORY MAINTAINED AT THE EPA REGION IV DOCKET ROOM AND THE NORTH MIAMI PUBLIC LIBRARY. THE NOTICE OF AVAILABILITY OF THESE DOCUMENTS WAS PUBLISHED IN THE MIAMI HERALD ON MARCH 16 AND 25, 1990. PUBLIC NOTICE WAS ALSO GIVEN IN THE NEW TIMES, A LOCAL PAPER, ON MARCH 21, 1990. A PUBLIC COMMENT PERIOD WAS HELD FROM MARCH 16 THROUGH APRIL 14, 1990. A PUBLIC MEETING WAS HELD ON MARCH 29, 1990 AT FLORIDA INTERNATIONAL UNIVERSITY. AS WITH THE FIRST PLAN, SOME CITIZENS AND GROUPS FAVORED EPA INVOLVEMENT, WHEREAS, OTHERS DID NOT. IN ADDITION, ADDITIONAL HEALTH THREATS WERE CITED DUE TO THE RECENT FIRE AT THE LANDFILL.

SECTION 3

SUMMARY OF COMMENTS RECEIVED AND AGENCY RESPONSES

THIS SECTION OF THE RESPONSIVENESS SUMMARY IS INTENDED TO SUMMARIZE COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD FROM INTERESTED PARTIES, INCLUDING CITIZENS' GROUPS OR INDIVIDUALS IN THE COMMUNITY, LOCAL OFFICIALS AND TECHNICAL ADVISORS. THE RESPONSIVENESS SUMMARY SERVES TWO VITAL FUNCTIONS IN THAT IT PROVIDES DECISION MAKERS WITH INFORMATION ABOUT THE VIEWS OF THE PUBLIC, GOVERNMENT AGENCIES AND POTENTIALLY RESPONSIBLE PARTIES REGARDING THE PROPOSED REMEDIAL ACTION AND OTHER ALTERNATIVES. SECOND, IT DOCUMENTS HOW COMMENTS HAVE BEEN CONSIDERED DURING THE DECISION MAKING PROCESS.

IN AN EFFORT TO PROVIDE CLEAR, CANDID RESPONSES, THIS SECTION HAS BEEN DIVIDED INTO TWO MAJOR PARTS. PART I WILL BE A SUMMARY OF MAJOR ISSUES AND CONCERNS RAISED BY THE LOCAL COMMUNITY. LOCAL COMMUNITY WILL BE CONSIDERED THOSE INDIVIDUALS WHO HAVE IDENTIFIED THEMSELVES AS LIVING IN THE IMMEDIATE VICINITY OF THE SUPERFUND SITE. THE INTENT OF PART I IS TO PROVIDE CLEAR, AND CONCISE ANSWERS TO LOCAL CONCERNS.

PART II WILL BE A COMPREHENSIVE RESPONSE TO SIGNIFICANT COMMENTS COMPRISING MOSTLY LEGAL AND TECHNICAL QUESTIONS. THE RESPONSES IN THIS PART WILL CONTAIN, AS NECESSARY, DETAILS REGARDING ISSUES THAT MAY HAVE BEEN BRIEFLY DISCUSSED IN PART I. PARTS I AND II, THEREFORE, MAY ADDRESS OVERLAPPING ISSUES. ANY POINTS OF CONFLICT OR AMBIGUITY BETWEEN THE TWO PARTS WILL BE RESOLVED IN FAVOR OF THE DETAILED TECHNICAL AND LEGAL PRESENTATION IN PART II.

EACH PART OF THIS SECTION HAS BEEN DIVIDED INTO THREE COMMENT PERIODS AS DESCRIBED PREVIOUSLY. THESE ARE SPECIFICALLY RELATED TO THE JULY 1988 PROPOSED PLAN, THE NOVEMBER 1988 NOTICE OF CHANGE TO THE PROPOSED PLAN, AND THE MARCH 1990 PROPOSED PLAN.

PART I: LOCAL COMMUNITY CONCERNS

COMMENTS REGARDING THE JULY 1988 PROPOSED PLAN

PUBLIC HEALTH AND THE ENVIRONMENT

1. A LOCAL CITIZEN AND THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) EXPRESSED CONCERN THAT RELEASES OF HAZARDOUS SUBSTANCES TO THE ADJACENT WETLAND AREAS AND BISCAYNE BAY MAY ADVERSELY AFFECT THE WILDLIFE OF THE AREA. THEY REQUESTED THAT EPA REQUIRE REMEDIAL ACTION AT THE SITE THAT WILL PREVENT THE RELEASE OF CONTAMINANTS TO THE ENVIRONMENT AND BE PROTECTIVE OF AREA WILDLIFE.

EPA RESPONSE: THESE CONCERNS PROMPTED EPA TO CONDUCT A WATER QUALITY AND TOXIC ASSESSMENT STUDY AT THE SITE. RESULTS FROM EPA'S WATER QUALITY AND TOXIC ASSESSMENT STUDY, MANGROVE PRESERVE (JUNE 1989) DEMONSTRATED THAT LEACHATE WAS MIGRATING FROM THE LANDFILL INTO THE ADJACENT STATE MANGROVE PRESERVE, ADVERSELY AFFECTING THE AQUATIC LIFE OF THE PRESERVE. BASED ON THIS THREAT TO THE ENVIRONMENT, EPA IS TAKING REMEDIAL ACTION PURSUANT TO SECTION 104(A) OF CERCLA TO PREVENT THE RELEASE OF LEACHATE INTO THE PRESERVE AND PROTECT THE ENVIRONMENT. THE CERCLA REMEDIAL ACTION WILL COLLECT AND TREAT CONTAMINATED GROUNDWATER UNTIL THE DECOMPOSITION OF WASTE IN THE LANDFILL IS COMPLETE AND TOXIC LEACHATE IS NO LONGER RELEASED INTO THE ENVIRONMENT.

2. A PARTICIPANT AT THE PUBLIC MEETING EXPRESSED CONCERN THAT THE MANMADE LAKES THAT WERE CREATED TO PROVIDE COVER FOR THE LANDFILL AREAS OVERFLOW AND ASKED WHAT WOULD BE DONE TO CORRECT THIS DURING THE REMEDIAL ACTION. HE INDICATED THAT THIS OVERFLOW IS A NUISANCE AND LIKELY TRANSPORTS CONTAMINANTS TO RESIDENT'S PROPERTY.

EPA RESPONSE: WHEN THIS COMMENT WAS MADE, THE PROPOSED PLAN WAS FOR THE LAKES TO BE FILLED IN AND THE SITE CAPPED AS PART OF A SUPERFUND REMEDIAL ACTION, WHICH INCLUDED LANDFILL CLOSURE. SINCE THE ORIGINAL PLAN WAS DEVELOPED, A DECISION HAS BEEN MADE TO ALLOW THE STATE TO EXECUTE THE CLOSURE OF THE LANDFILL UNDER STATE AUTHORITY PURSUANT TO FLORIDA ADMINISTRATIVE CODE (FAC) 17-701. CONCERNS REGARDING THE LANDFILL, THEREFORE, SHOULD BE EXPRESSED TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION (FDER) SO THAT THEY CAN BE ADDRESSED DURING THE CLOSURE DESIGN.

3. A LOCAL RESIDENT CITED PERCEIVED ADVERSE HEALTH EFFECTS CAUSED BY THE PRESENCE OF THE LANDFILL. IN ADDITION, THE RESIDENT WAS CONCERNED THAT CLOSURE OPERATIONS WOULD CAUSE ADDITIONAL PROBLEMS DUE TO THE SMELL AND DUST.

EPA RESPONSE: AS STATED PREVIOUSLY, CLOSURE ACTIVITIES NOW WILL BE CONDUCTED UNDER STATE AUTHORITY IN ACCORDANCE WITH FAC 17-701. THESE CONCERNS ARE DOCUMENTED HERE, BUT WILL NEED TO BE ADDRESSED BY THE STATE DURING ITS CLOSURE DESIGN AND CONSTRUCTION.

4. A LOCAL CITIZEN WHO ALSO IS A REPRESENTATIVE OF THE IZAAK WALTON LEAGUE, MANGROVE CHAPTER, EXPRESSED SUPPORT FOR THE LISTING THE LANDFILL ON THE NPL. CONCERN WAS EXPRESSED THAT, IF THE LANDFILL IS DELISTED, IT WILL NOT BE PROPERLY CLOSED AND CONSEQUENTLY, THE PUBLIC AND ENVIRONMENT NOT ADEQUATELY PROTECTED.

EPA RESPONSE: BASED ON THE RESULTS OF EPA'S RECENT STUDY OF THE MANGROVE PRESERVE, IT IS APPARENT THAT HAZARDOUS SUBSTANCES ARE BEING RELEASED FROM THE LANDFILL IN THE FORM OF LEACHATE AND THAT THESE SUBSTANCES REPRESENT A SIGNIFICANT THREAT TO THE ENVIRONMENT. HENCE, EPA HAS DETERMINED THAT REMEDIAL ACTION PURSUANT TO SECTION 104 OF CERCLA, AS AMENDED, IS WARRANTED AND THAT DELISTING OF THE LEACHATE SITE FROM THE NPL IS NOT APPROPRIATE.

IT SHOULD BE NOTED, HOWEVER, THAT EPA IS DIRECTED BY SECTION 105(A)(8)(B) OF CERCLA, AS AMENDED, TO LIST NATIONAL PRIORITIES AMONG "KNOWN RELEASES OR THREATENED RELEASES" OF HAZARDOUS SUBSTANCES, NOT CONTIGUOUS PORTIONS OF COMMUNITY OWNED PROPERTY. CONSISTENT WITH THIS DEFINITION AND THE NATIONAL CONTINGENCY PLAN (NCP), THE MUNISPORT RELEASE, AT THIS TIME, ONLY INCLUDES THE AREA IN THE MANGROVE PRESERVE IN WHICH THE RELEASE HAS BEEN DOCUMENTED AND THE

AMOUNT OF LAND (APPROXIMATELY 30 ACRES) NEEDED TO IMPLEMENT THE CERCLA REMEDIAL ACTION. THE REMAINING PORTION OF THE LANDFILL IS SIMILAR TO OTHER MUNICIPAL LANDFILLS OPERATED IN A SIMILAR TIME PERIOD AND SHOULD REMAIN UNDER STATE JURISDICTION AND CLOSED IN ACCORDANCE WITH STATE LANDFILL CLOSURE RULES. FLORIDA'S LANDFILL CLOSURE REQUIREMENTS ARE AMONG THE MOST STRINGENT IN THE NATION. A PROPER CLOSURE UNDER STATE LAW SHOULD ALLEVIATE ANY CONCERNS ABOUT THE LANDFILL.

5. A LOCAL RESIDENT TELEPHONED EPA TO EXPRESS AN OPINION THAT THE LANDFILL DID NOT POSE A HEALTH THREAT AND THAT THE CITY SHOULD BE ALLOWED TO USE THE SITE. THE CITIZEN DID NOT BELIEVE THAT HAZARDOUS WASTES WERE AT THE LANDFILL.

EPA RESPONSE: THE AGENCY AGREES THAT THE LANDFILL DOES NOT POSE A SIGNIFICANT THREAT TO PUBLIC HEALTH BASED ON THE RESULTS OF THE 1988 REMEDIAL INVESTIGATION (RI). THE LANDFILL, THEREFORE, WILL BE CLOSED UNDER STATE AUTHORITY. THE STATE WILL HAVE JURISDICTION REGARDING THE FUTURE USE OF THE SITE.

FUNDING

1. A LOCAL CITIZEN QUESTIONED EPA ON THE AVAILABILITY OF FEDERAL FUNDS TO FINANCE THE CLEANUP OF THE MUNISPORT SITE.

EPA RESPONSE: SUPERFUND WAS ESTABLISHED FOR THE CLEANUP OF UNCONTROLLED ABANDONED HAZARDOUS WASTE SITES WHERE THERE IS NO RESPONSIBLE PARTY (RP) TO FUND THE CLEANUP OR THE RESPONSIBLE PARTY IS EITHER FINANCIALLY UNABLE OR UNWILLING TO FINANCE THE CLEANUP. IN THE CASE OF MUNISPORT, POTENTIALLY RESPONSIBLE PARTIES HAVE BEEN IDENTIFIED AND EPA WILL PURSUE NEGOTIATIONS WITH THE PRPS TO FUND THE REMEDIAL ACTION. IN THE EVENT THE PRPS DO NOT FUND THE REMEDIAL ACTION, EPA MAY ELECT TO FUND THE REMEDIAL ACTION WITH MONIES FROM SUPERFUND. PURSUANT TO SECTION 107 OF CERCLA, EPA CAN PURSUE RECOVERY OF THE REMEDIAL ACTION COSTS FROM THE RP THROUGH LEGAL ACTIONS.

2. A LOCAL RESIDENT HAS OBSERVED AN IMPROVEMENT IN THE CONDITION OF THE LANDFILL AND EXPRESSED A DESIRE TO LET NATURAL PROCESSES SOLVE THE PROBLEM AND AVOID SPENDING THE MONEY REQUIRED TO CLOSE THE LANDFILL.

EPA RESPONSE: CLOSURE OF A LANDFILL DOES RELY ON NATURAL PROCESSES TO DECAY BURIED MATERIALS. A CLOSURE IS INTENDED TO MITIGATE THE EFFECTS OF THE LANDFILL ON SURROUNDING AREAS.

COMMENTS REGARDING THE NOVEMBER 1988 NOTICE OF CHANGE TO PROPOSED PLAN

JURISDICTION OF THE REMEDIAL ACTION

1. REPRESENTATIVES OF THE HIGHLAND VILLAGE RESIDENTS; THE IZAAK WALTON LEAGUE OF AMERICA; THE IZAAK WALTON LEAGUE, MANGROVE CHAPTER; THE SIERRA CLUB, MIAMI GROUP; FRIENDS OF THE OLETA RIVER STATE PARK; KEYSTONE POINT HOMEOWNERS ASSOCIATION AND SEVERAL LOCAL RESIDENTS COMMENTED IN SUPPORT OF CONTINUED EPA INVOLVEMENT AND JURISDICTION AT THE MUNISPORT LANDFILL.

EPA RESPONSE: SINCE THE CLOSURE OF THE COMMENT PERIOD IN WHICH THESE COMMENTS WERE MADE, AND IN RESPONSE TO THE COMMENTS EPA HAS OBTAINED ADDITIONAL DATA FROM THE 1989 MANGROVE STUDY. THIS DATA DEMONSTRATES THAT THE RELEASE OF LEACHATE FROM THE MUNISPORT LANDFILL REPRESENTS A SIGNIFICANT THREAT TO THE ENVIRONMENT. HENCE, EPA HAS DETERMINED THAT REMEDIAL ACTION IS WARRANTED TO ABATE THE THREAT TO AQUATIC LIFE IN THE MANGROVE PRESERVE. EPA WILL RETAIN JURISDICTION AND IMPLEMENT THE ACTION CONCERNING THE RELEASE OF HAZARDOUS SUBSTANCES TO THE ENVIRONMENT. THE "SUPERFUND SITE" IS THE EXTENT OF THE RELEASE OF HAZARDOUS SUBSTANCES FROM THE LANDFILL AND THAT PORTION OF THE LANDFILL PROPER NEEDED TO IMPLEMENT THE CERCLA REMEDIAL ACTION.

BASED ON THE CURRENT EVIDENCE, EPA CONSIDERS THE REMAINING PORTION OF THE LANDFILL SIMILAR TO OTHER MUNICIPAL LANDFILLS OPERATED IN A SIMILAR TIME PERIOD AND, AS SUCH, SHOULD REMAIN UNDER STATE JURISDICTION AND PROPERLY CLOSED IN ACCORDANCE WITH FLORIDA LAW.

2. LOCAL RESIDENTS, A LOCAL COMMERCIAL PROPERTY OWNER, A MEMBER OF THE FLORIDA HOUSE OF REPRESENTATIVES (AT THE TIME OF THE COMMENT PERIOD), A REPRESENTATIVE OF THE WESTSIDE PROPERTY OWNERS ASSOCIATION, TWO FORMER MAYORS OF THE CITY OF NORTH MIAMI, THE MAYOR OF NORTH MIAMI (AT THE TIME OF THE COMMENT PERIOD), AND A REPRESENTATIVE OF THE NORTH MIAMI CHAMBER OF COMMERCE COMMENTED IN FAVOR OF STATE JURISDICTION REGARDING REMEDIAL ACTION OR CLOSURE ACTIONS AT THE MUNISPORT LANDFILL. THE MAYOR OF NORTH MIAMI (AT THE TIME OF THE COMMENT PERIOD) ALSO COMMENTED THAT THE SITE WAS IMPROPERLY PLACED ON THE NPL DUE TO AN ERROR IN THE PREPARATION OF THE HAZARD RANKING SYSTEM SCORE AND THAT THE RESULTS FROM THE RI DID NOT IDENTIFY ANY RISKS TO HUMAN HEALTH OR THE ENVIRONMENT. HENCE, THE SITE SHOULD BE REMOVED FROM THE NPL AND THE CITY BE ALLOWED TO CLOSE THE LANDFILL UNDER STATE AUTHORITY IN ACCORDANCE WITH FAC CHAPTER 17-701, LANDFILL CLOSURE RULES.

EPA RESPONSE: AS DISCUSSED IN A PREVIOUS RESPONSE, EPA HAS OBTAINED ADDITIONAL DATA FROM ITS 1989 MANGROVE STUDY WHICH DEMONSTRATES THAT HAZARDOUS SUBSTANCES ARE BEING RELEASED FROM THE MUNISPORT LANDFILL AND SURFACING IN THE MANGROVE PRESERVE. WHILE THE RESULTS OF THE 1988 RI DID NOT DEMONSTRATE A THREAT TO PUBLIC HEALTH AND WAS INCONCLUSIVE REGARDING THE THREAT TO THE ENVIRONMENT POSED BY THE LANDFILL, THE 1989 MANGROVE STUDY CONCLUSIVELY DEMONSTRATED THAT THE EMERGENCE OF LEACHATE IN THE MANGROVE PRESERVE IS RESULTING IN SIGNIFICANT TOXIC EFFECTS ON THE AQUATIC LIFE IN THE PRESERVE. EPA HAS DETERMINED THAT THESE TOXIC EFFECTS REPRESENT A SIGNIFICANT THREAT TO THE ENVIRONMENT AND THAT CERCLA REMEDIAL ACTION IS WARRANTED. HENCE, DELISTING OF THE SITE IS NOT APPROPRIATE AT THIS TIME.

FURTHERMORE, IT IS APPROPRIATE FOR EPA TO RETAIN JURISDICTION REGARDING THE REMEDIATION OF THE RELEASE OF HAZARDOUS SUBSTANCES. HOWEVER, THE "SUPERFUND SITE" IS THE EXTENT OF THE RELEASE OF HAZARDOUS SUBSTANCES FROM THE LANDFILL AND THAT PORTION OF THE LANDFILL PROPER NEEDED TO IMPLEMENT THE CERCLA REMEDIAL ACTION. BASED ON THE CURRENT EVIDENCE, EPA CONSIDERS THE REMAINING PORTION OF THE LANDFILL SIMILAR TO OTHER MUNICIPAL LANDFILLS OPERATED IN A SIMILAR TIME PERIOD AND, AS SUCH, SHOULD REMAIN UNDER STATE JURISDICTION AND BE PROPERLY CLOSED IN ACCORDANCE WITH FLORIDA LAW.

PUBLIC HEALTH AND THE ENVIRONMENT

1. THE HIGHLAND BEACH RESIDENTS COMMITTEE, A REPRESENTATIVE OF THE DADE COUNTY DEPARTMENT OF ENVIRONMENTAL RESOURCES MANAGEMENT, THE IZAAK WALTON LEAGUE OF AMERICA, INCORPORATED, THE MIAMI GROUP OF THE SIERRA CLUB, FRIENDS OF THE OLETA RIVER STATE PARK, THE FLORIDA DIVISION OF THE IZAAK WALTON LEAGUE OF AMERICA, AND THE IZAAK WALTON LEAGUE MANGROVE CHAPTER EXPRESSED CONCERN THAT LEACHATE FROM THE LANDFILL HAS AN ADVERSE IMPACT ON THE ADJACENT WILDLIFE HABITAT AND RECREATION AREAS OF THE MANGROVE PRESERVE, BISCAYNE BAY AND THE OLETA RIVER.

EPA RESPONSE: THE AGENCY AGREES WITH THE CONCERN EXPRESSED BY THE GROUPS LISTED ABOVE. TO EVALUATE THE THREAT OF LEACHATE ON THE DOWNGRAIENT SYSTEMS, IN PARTICULAR THE MANGROVE PRESERVE, EPA CONDUCTED A WATER QUALITY AND TOXIC ASSESSMENT STUDY. THE RESULTS OF THE STUDY DEMONSTRATED THAT THE LEACHATE MIGRATING FROM THE LANDFILL INTO THE MANGROVE PRESERVE PRESENTS A SIGNIFICANT THREAT TO THE ENVIRONMENT. GIVEN THE DATA FOUND IN THE RI, THERE WAS NO BASIS FOR CONCERN THAT THE LANDFILL AFFECTED THE BAY OR THE OLETA RIVER.

2. TWO LOCAL RESIDENTS, THE FRIENDS OF THE OLETA RIVER STATE PARK, AND THE IZAAK WALTON LEAGUE MANGROVE CHAPTER EXPRESSED A CONCERN THAT TOXIC SUBSTANCES FROM THE LANDFILL COULD ADVERSELY AFFECT THE HEALTH OF LOCAL RESIDENTS AND STUDENTS AT FLORIDA INTERNATIONAL UNIVERSITY WHICH IS LOCATED ADJACENT TO THE SITE.

EPA RESPONSE: THE HEALTH ASSESSMENT IN THE RI/FS INDICATES THERE IS NO SIGNIFICANT THREAT TO HUMAN HEALTH POSED BY THE LANDFILL UNDER ITS CURRENT USE. PROPER CLOSURE OF THE LANDFILL UNDER FLORIDA LAW, WITH THE APPROPRIATE AMOUNT OF COVER MATERIAL AND LAND USE RESTRICTIONS, SHOULD ELIMINATE HEALTH THREATS TO FUTURE USERS. IT IS PRESUMED THAT FDER WILL CONSIDER THE HEALTH OF ITS CITIZENS IN DIRECTING THE CLOSURE OF THIS LANDFILL.

3. A LOCAL RESIDENT EXPRESSED CONCERN THAT IF THE SITE WAS DELISTED AND NO REMEDIAL ACTION TAKEN, HEAVY RAINS OR A TIDAL SURGE WOULD TRANSPORT CONTAMINATION TO RESIDENTIAL AREAS.

EPA RESPONSE: THE POSSIBILITY CANNOT BE RULED OUT THAT A PULSE OF MORE CONCENTRATED LEACHATE MIGHT BE GENERATED AS A RESULT OF HEAVY RAINFALL OR A HURRICANE SURGE. THERE IS NO INDICATION THAT THE LEACHATE SO GENERATED WOULD BE TOXIC, EXCEPT TO AQUATIC ORGANISMS. THE OVERALL CONCERN EXPRESSED BY THIS COMMENT THAT NO REMEDIAL ACTION COULD CAUSE ADVERSE CONSEQUENCES HAS BEEN ADDRESSED IN THAT THE LEACHATE FROM THE LANDFILL WILL BE TREATED AND THE LANDFILL WILL BE CLOSED UNDER STATE LAW.

COMMENTS REGARDING THE MARCH 1990 PROPOSED PLANE

FIRE AT THE LANDFILL

1. DURING THE PUBLIC MEETING, A MEMBER OF THE NORTH MIAMI CITY COUNCIL ASKED EPA TO EXPLAIN THE ROLE OF LOCAL VERSUS FEDERAL AGENCIES RESPONSIBLE FOR THE PROTECTION OF PUBLIC HEALTH IN THE CASE OF THE SMOKE HAZARDS CAUSED BY THE FIRE AT THE LANDFILL.

EPA RESPONSE: EPA INDICATED DURING THE MEETING THAT THERE ARE NO KNOWN FEDERAL AGENCIES CHARGED WITH THE PROTECTION OF PUBLIC HEALTH IN THE CASE OF MUNICIPAL LANDFILL FIRES. THE PROTECTION OF THE PUBLIC IN THE CASE OF HAZARDS DUE TO FIRES IS WITHIN THE JURISDICTION OF LOCAL AUTHORITIES.

IN THE ABSENCE OF A RELEASE OR THREATENED RELEASE OF HAZARDOUS SUBSTANCES, OR A RELEASE OR THREATENED RELEASE OF A POLLUTANT OR CONTAMINANT THAT POSES AN IMMINENT AND SUBSTANTIAL THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT, EPA DOES NOT HAVE ANY RESPONSE AUTHORITY UNDER CERCLA. IN THE CASE OF MUNISPORT LANDFILL, THE AGENCY DOES NOT HAVE EVIDENCE, NOR DO THE DATA INDICATE, THAT HAZARDOUS WASTE WAS DISPOSED AT THE LANDFILL. THEREFORE, THE AGENCY DETERMINED THAT THE FIRE AT THE LANDFILL DID NOT CONSTITUTE A THREAT OF RELEASE OF HAZARDOUS SUBSTANCES. TO ALLAY PUBLIC CONCERN, EPA CONDUCTED TWO SEPARATE AIR MONITORING EVENTS DURING THE COURSE OF THE FIRE. THE RESULTS INDICATED THAT HAZARDOUS SUBSTANCES WERE NOT BEING RELEASED TO THE ATMOSPHERE AT LEVELS THAT WOULD BE A RISK TO THE PUBLIC. THEREFORE, EPA DID NOT HAVE THE AUTHORITY TO REQUIRE THE CITY OF NORTH MIAMI TO EXTINGUISH THE FIRE.

FUNDING THE REMEDIAL ACTION

1. DURING THE PUBLIC MEETING, THE MAYOR FOR THE CITY OF NORTH MIAMI ASKED IF FUNDS WERE AVAILABLE FOR CLEANUP THROUGH SUPERFUND.

EPA RESPONSE: EPA RESPONDED DURING THE MEETING THAT SUPERFUND IS DESIGNED TO PRIMARILY ADDRESS PUBLIC HEALTH THREATS AT UNCONTROLLED ABANDONED HAZARDOUS WASTE SITES. ALTHOUGH THE FUNDING FOR SUPERFUND IS CONSIDERABLE, IT IS LIMITED DUE TO THE NUMBER OF SITES EPA MUST ADDRESS. DUE TO THIS CONSTRAINT, FUNDING FOR SITES MUST BE PRIORITIZED BASED ON THE SEVERITY OF THE THREAT TO PUBLIC HEALTH. SINCE THE MUNISPORT LANDFILL DOES NOT POSE A THREAT TO PUBLIC HEALTH, THE PRIORITY FOR FUNDING WOULD BE MUCH LOWER THAN OTHER SITES THAT POSE A SIGNIFICANT THREAT TO PUBLIC HEALTH.

AT THE COMPLETION OF THE RECORD OF DECISION (ROD), EPA PLANS TO GIVE THE CITY OF NORTH MIAMI THE OPPORTUNITY TO PERFORM THE REMEDIAL DESIGN (RD) AND REMEDIAL ACTION (RA). IF THE CITY DOES NOT

ELECT TO CONDUCT THE RD/RA, EPA MAY DECIDE TO PROCEED WITH THE RD/RA AND RECOVER THE COST FOR PERFORMING THE REMEDY FROM THE CITY AT A LATER DATE.

IDENTIFICATION AND ASSESSMENT OF PRPS

1. DURING THE PUBLIC MEETING, A LOCAL RESIDENT ASKED IF OTHER PARTIES EXIST THAT MAY BE ALSO LIABLE FOR THE CLEANUP OF THE SITE. SPECIFICALLY, COULD THE FORMER OPERATOR OF THE FACILITY BE IDENTIFIED AS A POTENTIALLY RESPONSIBLE PARTY AND HELD LIABLE FOR PART OF THE COSTS OF REMEDIAL ACTION.

EPA RESPONSE: THE EVIDENCE THAT THE AGENCY CURRENTLY POSSESSES DOES NOT SHOW THAT THE OPERATOR OF THE LANDFILL OPERATED ANYTHING OTHER THAN A MUNICIPAL LANDFILL. THERE IS NO EVIDENCE THAT THE LANDFILL WAS OPERATED AS A HAZARDOUS WASTE DISPOSAL FACILITY. HENCE, BASED ON THE CURRENT INFORMATION, THE FORMER OPERATOR OF THE LANDFILL DOES NOT APPEAR TO BE LIABLE FOR PART OF THE REMEDIAL ACTION COST OF THE LANDFILL AT THIS TIME. EPA WILL CONTINUE TO GATHER INFORMATION REGARDING THE PRIOR GENERATORS AND OPERATIONS AT THE SITE.

SINCE THE PUBLIC MEETING, NUMEROUS INDIVIDUALS STATED THAT THEY OBSERVED OR HAD KNOWLEDGE OF THE DISPOSAL OF HAZARDOUS WASTE AT THE LANDFILL. EPA AGREED TO INVESTIGATE THE MATTER FURTHER. SHORTLY AFTER THE PUBLIC MEETING, EPA SENT A CIVIL INVESTIGATOR TO NORTH MIAMI, FLORIDA TO MEET WITH LOCAL RESIDENTS AND REVIEW DOCUMENTS TO DETERMINE WHETHER OR NOT ADDITIONAL PRP'S EXIST. THE AGENCY'S EFFORTS TO DATE, HAVE NOT YIELDED NEW EVIDENCE THAT COULD BE USED IN THE IDENTIFICATION OF ADDITIONAL PRPS.

RESPONSE AND CLEANUP TIME

1. THE MAYOR OF THE CITY OF NORTH MIAMI AND A NORTH MIAMI RESIDENT, EXPRESSED CONCERN THAT LITTLE PROGRESS HAS BEEN MADE IN CLEANING UP THE SITE IN 7 YEARS AND ASKED WHEN CLEANUP WOULD BEGIN. A LOCAL RESIDENT ALSO ASKED HOW SOON FINANCING WOULD BE RESOLVED AND CLEANUP WOULD BEGIN.

EPA RESPONSE: THE ROD WILL BE FOLLOWED BY A NEGOTIATION PERIOD TO GIVE THE CITY OF NORTH MIAMI THE OPPORTUNITY TO ENTER INTO AN AGREEMENT FOR PERFORMING CLEANUP PRIOR TO SUPERFUND INVOLVEMENT. AFTER THE NEGOTIATIONS ARE COMPLETE, THE CONCEPTUAL DESIGN SHOULD BEGIN.

2. A LOCAL RESIDENT ASKED WHAT PERIOD OF TIME WOULD BE REQUIRED TO COMPLETE CLEANUP OF THE SITE.

EPA RESPONSE: BASED ON OBSERVATION AT OTHER LANDFILLS, THE ESTIMATED CLEANUP TIME FOR THE LANDFILL LEACHATE IS BETWEEN ABOUT 15 AND 40 YEARS. IT IS NOT POSSIBLE TO ESTIMATE THE EXACT CLEANUP DURATION AT THIS TIME. HOWEVER, ONCE CLEANUP HAS BEGUN, THE ACTUAL PERFORMANCE OF THE RECOVERY AND TREATMENT SYSTEM CAN BE USED TO BETTER PREDICT THE RATE OF CLEANUP. ADDITIONALLY, CLOSURE OF THE LANDFILL PORTION BY THE STATE MAY TAKE CONSIDERABLY LESS TIME.

PREFERRED REMEDIAL ACTION ALTERNATIVE

1. A RESIDENT OF NORTH MIAMI EXPRESSED CONCERN ABOUT ODOR ASSOCIATED WITH AN AIR STRIPPER DISCHARGE AND, SPECIFICALLY, IF THE COMBINED EFFECT FROM THE DADE COUNTY SEWER PLANT NORTH OF THE LANDFILL HAS BEEN CONSIDERED.

EPA RESPONSE: AT THIS TIME, THE COMBINATION OF DISCHARGES FROM THE PROPOSED AIR STRIPPER AND THE DADE COUNTY WASTEWATER PLANT ARE NOT EXPECTED TO CAUSE A PROBLEM. HOWEVER, PILOT TESTING, INCLUDING EVALUATION OF AIR QUALITY IN THE AREA, WILL BE CONDUCTED PRIOR TO CONSTRUCTION. THE FINAL DESIGN WILL BE MODIFIED, IF NECESSARY, TO CORRECT INADEQUACIES OBSERVED DURING THE PILOT TEST.

2. THE PRESIDENT OF HIGHLAND VILLAGE RESIDENTS COMMITTEE, EXPRESSED CONCERN OVER POTENTIAL AIRBORNE RELEASES OF UNKNOWN POLLUTANTS, PCBS, LEAD, AND SILVER FROM THE AIR STRIPPING SYSTEM.

EPA RESPONSE: AIR STRIPPING IS AN EFFECTIVE MEANS OF REMOVING VOLATILE ORGANIC COMPOUNDS (VOCs) FROM WATER, BUT UNDER NORMAL OPERATING CONDITIONS, WILL NOT REMOVE LESS VOLATILE CONTAMINANTS SUCH AS PCBS, SILVER, LEAD. WATER EFFLUENTS FROM THE TREATMENT SYSTEM WILL BE MONITORED REGULARLY FOR THE PRESENCE OF THESE AND OTHER CONTAMINANTS. IF, DURING OPERATION, NEW CONTAMINANTS ARE IDENTIFIED OR DISCHARGES EXCEED ARARS, THE SYSTEM WILL BE EXPANDED OR MODIFIED TO ACHIEVE COMPLIANCE.

3. A RESIDENT OF NORTH MIAMI, ASKED IF AERATION PONDS WOULD BE MONITORED SO THAT THERE WOULD NOT BE A DETRIMENTAL EFFECT ON THE WILDLIFE IN THE AREA.

EPA RESPONSE: THE ANTICIPATED PERFORMANCE OF THE PROPOSED ALTERNATIVES HAVE BEEN EVALUATED AGAINST NINE CRITERIA SPECIFIED BY THE EPA. THESE CRITERIA INCLUDE: 1) OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, 2) COMPLIANCE WITH ARARS, AND 3) REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT. AS DISCUSSED IN THE DRAFT FEASIBILITY STUDY ADDENDUM, ALL OF THE ACTION ALTERNATIVES SATISFY THESE CRITERIA. CONSEQUENTLY, THE PREFERRED ALTERNATIVE IS ANTICIPATED TO BE PROTECTIVE OF THE ENVIRONMENT. THE EFFLUENT FROM THE TREATMENT SYSTEM, HOWEVER, WILL BE MONITORED TO ASSESS COMPLIANCE AND PROTECTION OF WILDLIFE. EPA WILL TAKE STEPS TO PROTECT WILDLIFE IF DETRIMENTAL EFFECTS OF THE AERATION PONDS ARE DETECTED.

4. A NORTH MIAMI RESIDENT ASKED FOR VERIFICATION OF PROPOSED AREA TO BE USED FOR LEACHATE COLLECTION AND TREATMENT SINCE HE IS INTERESTED IN BUILDING A GOLF COURSE ON THE LANDFILL PROPERTY.

EPA RESPONSE: THE LEACHATE COLLECTION SYSTEM WILL LIKELY BE ALONG THE SOUTHEASTERN PERIMETER OF THE LANDFILL, OR ALONG THE DIKE SEPARATING THE LANDFILL AND THE MANGROVE PRESERVE, USING A SERIES OF APPROXIMATELY 17 RECOVERY WELLS OR HYDRAULIC BARRIER. THE AIR STRIPPING POND WILL BE CONSTRUCTED ON THE LANDFILL PROPERTY NEAR THE RECOVERY WELLS. CONSEQUENTLY, THE AREA CURRENTLY PROPOSED FOR THE TREATMENT SYSTEM DOES NOT INCLUDE MUCH OF THE LANDFILL PROPERTY. FUNDING, REMEDIAL DESIGN ISSUES, AND STATE AND LOCAL CONCERNS, NEED TO BE RESOLVED BEFORE THIS LAND CAN BE DESIGNATED FOR OTHER USES.

5. A NORTH MIAMI RESIDENT ASKED IF THE PROPOSED LAGOON WOULD DESTROY THE ALTERED WETLANDS, AND A LARGE AREA OF WHITE MANGROVES, AT THE NORTHEAST CORNER OF THE SITE.

EPA RESPONSE: ALTERNATIVE 2 PROPOSED BUILDING AIR STRIPPING TOWERS ON THE LANDFILL PORTION OF THE SITE, AND USING THE PLANTS IN THE MANGROVE AREA TO TREAT THE AMMONIA THROUGH NITRIFICATION.

DUE TO SOME PUBLIC AND JURISDICTIONAL CONCERNS OVER THE USE OF THE MANGROVE AREAS AS PART OF THE TREATMENT SYSTEM, ALTERNATIVE 3 IS RECOMMENDED BY EPA. ALTERNATIVE 3 WOULD NOT INCLUDE THE WETLANDS AS PART OF THE TREATMENT SYSTEM.

6. A NORTH MIAMI RESIDENT SUGGESTED BUILDING A DIKE SEPARATING THE WHITE MANGROVES FROM THE NORTHEAST CORNER OF THE SITE.

EPA RESPONSE: A DIKE, IF REQUIRED, WILL BE ADDRESSED AS A LATER ACTIVITY. DREDGING OR FILLING IN THE WETLANDS COULD CREATE SOME JURISDICTIONAL PROBLEMS. ALTERNATIVE 3, HOWEVER, MINIMIZES DISTURBING THE WETLANDS AND A DIKE WOULD NOT BE REQUIRED.

7. A NORTH MIAMI RESIDENT ASKED IF THE PROPERTIES SURROUNDING THE LANDFILL WOULD BE MADE AVAILABLE FOR OTHER USES.

EPA RESPONSE: THE ACREAGE REQUIRED TO IMPLEMENT THE REMEDIAL ACTION VARIES WITH EACH OF THE PROPOSED ALTERNATIVES, BUT, AT THIS POINT, THERE ARE NO PLANS TO CONSTRUCT A TREATMENT SYSTEM OUTSIDE OF THE 170-ACRE TRACT ASSOCIATED WITH THE LANDFILL. THE RECOVERY SYSTEM WOULD AFFECT A 2000-3000 FOOT STRIP ALONG THE WEST SIDES OF THE EXISTING MANGROVE PRESERVE DIKE OR JUST SOUTH AND EAST OF THE LANDFILL BOUNDARY. ADDITIONALLY, IT IS ESTIMATED AT THIS TIME THAT THE TREATMENT SYSTEM WILL BE NO LARGER THAN ABOUT 30 ACRES. SHOULD THE RESULTS OF THE HYDROLOGIC STUDY INDICATE THAT MORE AREA IS NEEDED TO EFFECT THE REMEDY, THE SIZE OF THE SITE WILL BE EXPANDED AS NEEDED.

PUBLIC HEALTH AND THE ENVIRONMENT

1. DURING THE PUBLIC MEETING, A LOCAL CITIZEN PROVIDED EPA WITH A LIST OF APPROXIMATELY 25 PEOPLE THAT RESIDE OR HAVE RESIDED NEAR THE LANDFILL AND HAVE EITHER DIED FROM OR HAVE CANCER. THE LOCAL CITIZEN WAS CONCERNED THAT THIS IS AN ABNORMALLY HIGH NUMBER OF CANCERS FOR A LOCAL AREA AND FELT THAT THEY WERE RELATED TO EXPOSURES FROM WASTES IN THE LANDFILL.

EPA RESPONSE: EPA HAD THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR) REVIEW THE LIST OF CANCER CASES AND DOCUMENTS CHARACTERIZING THE WASTE THAT COULD BE EXPECTED AT THE MUNISPORT LANDFILL. ATSDR REPORTED THAT THE NUMBER OF CANCER CASES REPORTED BY THE LOCAL CITIZEN IS CONSISTENT WITH NATIONAL STATISTICS REGARDING CANCER CASES. MOREOVER, ATSDR CONCURRED WITH EPA'S DETERMINATION THAT WASTES CHARACTERISTIC OF THE MUNISPORT LANDFILL DO NOT REPRESENT A THREAT TO PUBLIC HEALTH.

PART II: LEGAL AND TECHNICAL ISSUES

COMMENTS REGARDING THE JULY 1988 PROPOSED PLAN

JURISDICTION OF THE PROJECT

1. A REPRESENTATIVE OF THE IZAAK WALTON LEAGUE MANGROVE CHAPTER, EXPRESSED CONCERN THAT IF THE MUNISPORT LANDFILL PROPERTY WAS DELISTED FROM THE NATIONAL PRIORITIES LIST (NPL) AND ALLOWED TO BE SOLD FOR DEVELOPMENT, IT WOULD NOT BE CLEANED UP TO A DEGREE THAT WOULD BE PROTECTIVE OF PUBLIC HEALTH OR THE ENVIRONMENT. IT WAS, THEREFORE, THE REQUEST OF THE LEAGUE THAT THE PROPERTY NOT BE DELISTED FROM THE NPL.

EPA RESPONSE: BASED ON THE RESULTS OF THE EPA WATER QUALITY AND TOXIC ASSESSMENT STUDY, MANGROVE PRESERVE (JUNE 1989), EPA HAS DETERMINED THAT REMEDIAL ACTION PURSUANT TO SECTION 104(A) OF CERCLA IS WARRANTED TO PROTECT THE PRESERVE FROM LEACHATE. THE MUNISPORT "RELEASE" WILL REMAIN ON THE NPL, HOWEVER, THE AREA OF SUPERFUND REMEDIAL ACTION IS ESTIMATED AT 30 ACRES. THE SCOPE OF REMEDIAL ACTION DOES NOT INCLUDE CLOSURE OF THE LANDFILL. LANDFILL CLOSURE WILL BE ACCOMPLISHED UNDER STATE AUTHORITY.

2. THE CITY OF NORTH MIAMI AND NOAA EXPRESSED SUPPORT FOR THE CLOSURE OF THE LANDFILL UNDER STATE AUTHORITY AS THE APPROPRIATE METHOD OF REMEDIAL ACTION.

EPA RESPONSE: SINCE THE PERIOD IN WHICH THESE COMMENTS WERE MADE EPA HAS OBTAINED NEW DATA THAT HAVE PROMPTED THE DEVELOPMENT AND SELECTION OF A NEW METHOD OF REMEDIAL ACTION, HOWEVER, THIS COMMENT IS STILL RELEVANT. THE NEW DATA OBTAINED FROM THE 1989 EPA MANGROVE STUDY DEMONSTRATED THAT THERE IS AN UNCONTROLLED RELEASE OF HAZARDOUS SUBSTANCES FROM THE LANDFILL INTO THE ADJACENT STATE MANGROVE PRESERVE. AS A RESULT, EPA HAS DETERMINED THAT CERCLA REMEDIAL ACTION THAT INCLUDES THE INTERCEPTION, COLLECTION, AND TREATMENT OF THE HAZARDOUS SUBSTANCE PRIOR TO EMERGENCE INTO THE MANGROVE PRESERVE IS WARRANTED. SINCE THE RI/FS DID NOT REVEAL THE - PRESENCE OF ANY HAZARDOUS WASTES IN THE LANDFILL THAT REPRESENTS A SIGNIFICANT THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT AND THAT THE RELEASE OF HAZARDOUS SUBSTANCES (PRIMARILY AMMONIA)

APPEAR TO BE THE RESULT OF THE DECOMPOSITION OF MUNICIPAL WASTE DISPOSED IN THE LANDFILL, EPA HAS DETERMINED THAT CLOSURE OF THE LANDFILL PROPER UNDER STATE AUTHORITY IS APPROPRIATE, AND THEREFORE AGREES WITH THE COMMENT.

3. REPRESENTATIVES OF THE FRIENDS OF THE EVERGLADES, DADE COUNTY CHAPTER, THE SIERRA CLUB, MIAMI GROUP, AND THE IZAAK WALTON LEAGUE EXPRESSED CONCERN THAT IT IS NECESSARY FOR EPA TO REMAIN INVOLVED AND RETAIN JURISDICTION IN THE REMEDIAL ACTION ACTIVITIES AT THE SITE.

EPA RESPONSE: SINCE THE PERIOD IN WHICH THESE COMMENTS WERE MADE, NEW DATA HAS WARRANTED A CHANGE IN THE SCOPE OF THE CERCLA REMEDIAL ACTION, HOWEVER, THESE COMMENTS ARE STILL RELEVANT. EPA WILL RETAIN JURISDICTION OVER THE REMEDIAL ACTIONS TAKEN PURSUANT TO CERCLA. THESE ACTIONS WILL BE THE INTERCEPTION, COLLECTION, AND TREATMENT OF LEACHATE PRIOR TO ITS EMERGENCE IN THE MANGROVE PRESERVE. CLOSURE OF THE LANDFILL WILL BE CONDUCTED UNDER STATE AUTHORITY PURSUANT TO FAC CHAPTER 17-701, LANDFILL CLOSURE RULES. WITH REGARD TO LANDFILL CLOSURE, EPA WILL CONSULT WITH FDER ON THE COMPATIBILITY OF THE TWO ACTIONS. EPA WILL REVIEW THE TWO ACTIONS, WITHIN FIVE YEARS OF THE COMPLETION OF THE CONSTRUCTION OF THE TWO ACTIONS AND DETERMINE IF ADDITIONAL ACTION MAY BE WARRANTED.

4. COUNSEL FOR THE CITY OF NORTH MIAMI SUBMITTED A DOCUMENT ENTITLED PROPOSED FINDINGS OF FACT AND CONCLUSIONS FOR THE RECORD OF DECISION FOR THE MUNISPORT, FLORIDA, SUPERFUND SITE. THIS DOCUMENT OUTLINES HISTORICAL DATA ON THE LANDFILL PROPERTY AND CITES REASONS FOR EPA TO TAKE ACTION IN DELISTING THE SITE FROM THE NATIONAL PRIORITIES LIST (NPL). AMONG THE REASONS OUTLINED ARE THE FOLLOWING:

- SCORING ERROR LED TO THE ORIGINAL LISTING AND THE FACT THAT EPA HAS THE LEGAL AUTHORITY TO CORRECT THE ERROR.
- CASE LAW SETS PRECEDENTS FOR AGENCIES CORRECTING ERRORS AND MODIFYING ACTIONS.
- CONGRESSIONAL DEBATE CITED SCORING ERROR AT MUNISPORT.
- DELISTING PROPOSED BY MR. HENRY LONGEST, DIRECTOR OF EPA'S OFFICE OF EMERGENCY AND REMEDIAL RESPONSE, IF THE RI CONCLUDES THAT THERE IS NO SIGNIFICANT THREAT TO HUMAN HEALTH AND ENVIRONMENT.
- RESULTS OF RI INDICATED NO SIGNIFICANT THREAT OF HARM TO HUMAN HEALTH AND ENVIRONMENT.

EPA RESPONSE: THE PROPOSED RULEMAKING THAT INCLUDED THE FIRST NPL APPEARED IN THE FEDERAL REGISTER ON DECEMBER 30, 1982. THE ANNOUNCEMENT WAS A MAJOR MEDIA EVENT WITH WIDESPREAD NATIONAL AND LOCAL COVERAGE. IT WAS A SIGNIFICANT ISSUE IN FLORIDA, FUELED SOMEWHAT BY AN INTERIM LIST OF 115 SITES RELEASED BY EPA IN OCTOBER 1981 THAT INCLUDED 18 FLORIDA SITES, MORE THAN ANY OTHER STATE. ON DECEMBER 21, 1982, THE FIRST NPL WAS FRONT PAGE NEWS IN THE MIAMI HERALD WHICH PUBLISHED AN ARTICLE ON THE NEW PROPOSAL AND MENTIONED THE MUNISPORT SITE THREE TIMES.

EPA HELD A FORMAL 60 DAY PUBLIC COMMENT PERIOD FOLLOWING THE PUBLICATION OF THE PROPOSED LIST IN THE FEDERAL REGISTER AND CONSIDERED LATE COMMENTS WELL BEYOND THE END OF THE FORMAL PERIOD. THE FINAL RULE DECISION FOR THE FIRST NPL, INCLUDING THE MUNISPORT SITE, APPEARED IN THE FEDERAL REGISTER ON SEPTEMBER 8, 1983. EPA RECEIVED NO COMMENTS FROM THE CITY OF NORTH MIAMI, THE STATE OF FLORIDA, OR ANYONE ELSE OTHER THAN THE US DEPARTMENT OF INTERIOR MENTIONING CONCERNS ABOUT ENDANGERED SPECIES IN THE BISCAYNE BAY THAT COULD BE POTENTIALLY AFFECTED BY THE MUNISPORT SITE. FURTHERMORE, THE CITY OF NORTH MIAMI DID NOT CHALLENGE THE SITE'S FINAL LISTING IN THE D.C. CIRCUIT DURING THE 90-DAY JURISDICTIONAL REVIEW PERIOD COMMENCING SEPTEMBER 8, 1983.

ON SEPTEMBER 21, 1984, EPA PUBLISHED IN THE FEDERAL REGISTER ITS POLICY ON RESCORING SITES. THIS POLICY STATED THAT EPA'S RESOURCES AND EFFORTS SHOULD BE FOCUSED ON FURTHER INVESTIGATION OF THREATS AND DETERMINING APPROPRIATE CLEANUP, NOT RESCORING.

IN JULY, 1986 NORTH MIAMI PETITIONED EPA TO DELIST THE SITE BASED ON THE ALLEGED SCORING ERROR. THIS WAS APPROXIMATELY THREE AND ONE-HALF YEARS AFTER THE PROPOSED LISTING.

EPA DECIDED TO TAKE A COURSE OF ACTION CONSISTENT WITH THE 1984 POLICY AND INITIATED A REMEDIAL INVESTIGATION TO DETERMINE THE THREAT AND RESPONSE OPTIONS BEFORE CONSIDERING DELETING THE SITE. EPA'S POSITION IS THAT THE PUBLIC SHOULD BE PROVIDED A SOUND TECHNICAL BASIS BEFORE SUMMARILY REMOVING SITES FROM THE NPL.

EPA AGREES THAT IT HAS THE AUTHORITY TO CORRECT ITS OWN ERRORS OR OTHERWISE MODIFY ITS ACTIONS. HOWEVER, NORTH MIAMI'S RELIANCE ON THE A.L. LABORATORIES V. EPA 674 F.SUPP, 894 (D.D.C. NOVEMBER 23, 1987) IS NOT DISPOSITIVE IN THIS CASE FOR THREE MAIN REASONS. ONE, THE LISTS IN THE TWO CASES ARE OF DIFFERENT SIGNIFICANCE. THE INCLUSION OF FOUR SUBSTANCES ON THE EXTREMELY HAZARDOUS SUBSTANCES LIST HAD IMMEDIATE IMPACTS ON THE PLAINTIFFS IN THE CASE CITED. INCLUSION ON THIS LIST SUBJECTED THOSE WHO STORE SUFFICIENTLY LARGE QUANTITIES TO NOTIFICATION, REPORTING, AND PLANNING REQUIREMENTS UNDER TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA), OTHERWISE KNOWN AS THE "COMMUNITY RIGHT-TO-KNOW ACT". POTENTIAL FINES FOR FAILURE TO COMPLY RANGE FROM \$25,000 TO \$75,000, AND MAY BE ASSESSED DAILY.

THE NPL, ON THE OTHER HAND, IS MERELY AN INFORMATIONAL LIST OF THOSE SITES TO WHICH EPA HAS ASSIGNED A HIGH PRIORITY. LISTING DOES NOT MEAN THAT REMEDIAL ACTION WILL BE TAKEN, OR THAT ANY PARTICULAR PARTY IS LIABLE.

IN ENACTING CERCLA, CONGRESS SPECIFIED THAT THE NPL WAS INTENDED TO SERVE A NARROW PURPOSE:

THE PRIORITY LISTS SERVE PRIMARILY INFORMATIONAL PURPOSES, IDENTIFYING FOR THE STATES AND THE PUBLIC THOSE FACILITIES AND SITES OR OTHER RELEASES WHICH APPEAR TO WARRANT REMEDIAL ACTIONS. INCLUSION OF A FACILITY OR SITE ON THE LIST DOES NOT IN ITSELF REFLECT A JUDGEMENT OF THE ACTIVITIES OF ITS OWNER OR OPERATOR, IT DOES NOT REQUIRE THOSE PERSONS TO UNDERTAKE ANY ACTION, NOR DOES IT ASSIGN LIABILITY TO ANY PERSON. SUBSEQUENT GOVERNMENT ACTION IN THE FORM OF REMEDIAL ACTIONS WILL BE NECESSARY IN ORDER TO DO SO, AND THE ACTIONS WILL BE ATTENDED BY ALL APPROPRIATE PROCEDURAL SAFEGUARDS. (S. DEP. NO. 848, 96TH CONGRESS, SECOND SESSION 60 (1980).)

EPA HAS AFFIRMED THIS LANGUAGE IN NUMEROUS PREAMBLE STATEMENTS TO NPL RULEMAKINGS (SEE E.G., 48 FEDERAL REGISTER, 40658, 40659, SEPTEMBER 8, 1983, AND 52 FEDERAL REGISTER, 27620, 27621, JULY 22, 1987) AND IN ITS REGULATIONS (SEE 40 CFR 300.66(C) (2)). LISTING ON THE NPL SIMPLY MAKES A SITE ELIGIBLE FOR REMEDIAL ACTION FINANCED BY THE SUPER FUND ESTABLISHED UNDER CERCLA.

TWO, THE PLAINTIFFS IN A.L. LABORATORIES RAISED THEIR OBJECTIONS IN A TIMELY MANNER (I.E. WITHIN THE COMMENT PERIOD). THE COURTS HAVE INDICATED THAT CHALLENGES TO THE HRS SCORES NOT RAISED DURING THE PUBLIC COMMENT PERIOD MAY NOT BE RAISED LATER (NORTHSIDE SANITARY LANDFILL V. EPA, 849 F.2D 1516, 1521, D.C. CIR. 1988; EAGLE-PICHER INDUSTRIES V. EPA, 822 F.2D. 132, 146, D.C. CIR. 1987.).

THREE, IN A.L. LABS, EPA NEVER MADE A FINDING THAT THE SUBSTANCES IN QUESTION WERE HAZARDOUS. BY CONTRAST, EPA HAS MADE A FINDING THAT THERE IS A RELEASE OF HAZARDOUS SUBSTANCES FROM THE MUNISPORT SITE AND THAT THE SITE DOES POSE A SIGNIFICANT THREAT TO THE ENVIRONMENT.

THE CONGRESSIONAL COLLOQUIES SIMPLY CONFIRM EPA'S DISCRETIONARY AUTHORITY TO RESCORE SITES AND IN THIS INSTANCE EPA HAS CHOSEN NOT TO DO SO.

THE DECISION TO TAKE REMEDIAL ACTION AT THIS SITE IS CONSISTENT WITH THE REPRESENTATIONS MADE BY MR. HENRY LONGEST IN 1987. MR. LONGEST STATED THAT EPA WOULD PROMPTLY DELETE THE SITE IF THERE WERE NO SIGNIFICANT THREATS TO HUMAN HEALTH OR THE ENVIRONMENT. WHILE THE RI/FS INDICATED THERE WAS NO HUMAN HEALTH THREAT, IT WAS UNCLEAR AS TO THE ENVIRONMENTAL THREAT. CONCERNS EXPRESSED BY THE LOCAL CITIZENS, ENVIRONMENTAL GROUPS, NOAA, THE US FISH AND WILDLIFE SERVICE, AND FLORIDA DEPARTMENT OF NATURAL RESOURCES (FDNR) DURING THE PUBLIC COMMENT PERIODS PROMPTED EPA TO DO A MORE THOROUGH INVESTIGATION OF THE LEACHATE PROBLEM. THE AGENCY'S CHANGE OF POSITION IS AN AFFIRMATION OF THE PUBLIC PARTICIPATION IN THE CERCLA DECISIONMAKING PROCESS.

THE COMMENTER ALSO STATED THAT THE RI INDICATED NO SIGNIFICANT THREAT OF HARM TO HUMAN HEALTH OR THE ENVIRONMENT. THE AGENCY AGREES THAT THE RESULTS OF THE RI DID NOT DEMONSTRATE A THREAT TO PUBLIC HEALTH DUE TO THE RELEASE OF HAZARDOUS SUBSTANCES FROM THE LANDFILL. THE RI, HOWEVER, WAS INCONCLUSIVE WITH REGARD TO THE THREAT THAT A RELEASE POSED TO THE ENVIRONMENT. BASED ON COMMENTS FROM SEVERAL FEDERAL AGENCIES AND ENVIRONMENTAL GROUPS WHO EXPRESSED CONCERN THAT THE SITE MAY PRESENT A THREAT TO THE ENVIRONMENT, EPA CONDUCTED A WATER QUALITY AND TOXIC ASSESSMENT STUDY. THIS STUDY WAS DESIGNED TO SPECIFICALLY EVALUATE THE ENVIRONMENTAL THREAT THAT THE SITE MAY PRESENT TO AQUATIC LIFE IN THE MANGROVE PRESERVE ADJACENT TO THE LANDFILL. THE RESULTS OF THE STUDY DEMONSTRATED THAT LEACHATE MIGRATING FROM THE LANDFILL INTO THE PRESERVE PRESENTS A SIGNIFICANT THREAT TO AQUATIC LIFE.

COMMENTS REGARDING THE NOVEMBER 1988 NOTICE OF CHANGE TO PROPOSED PLAN

JURISDICTION OF THE PROPERTY

I. REPRESENTATIVES OF THE HIGHLAND VILLAGE RESIDENTS; IZAAK WALTON LEAGUE OF AMERICA; IZAAK WALTON LEAGUE, MANGROVE CHAPTER; SIERRA CLUB, MIAMI GROUP; FRIENDS OF THE OLETA RIVER; KEYSTONE POINT HOMEOWNERS ASSOCIATION AND SEVERAL LOCAL RESIDENTS COMMENTED IN SUPPORT OF CONTINUED EPA INVOLVEMENT AND JURISDICTION AT THE MUNISPORT LANDFILL. THE REPRESENTATIVE OF THE IZAAK WALTON LEAGUE, MANGROVE CHAPTER EXPRESSED CONCERN THAT FLAWS IDENTIFIED BY EPA'S CONSULTANT IN THE CITY OF NORTH MIAMI AND FDER LANDFILL CLOSURE PLAN ARE INDICATIVE OF A LACK OF GENUINE INTEREST IN THE PROPER CLOSURE OF THE LANDFILL.

EPA RESPONSE: SINCE THE CLOSURE OF THE COMMENT PERIOD IN WHICH THESE COMMENTS WERE MADE, EPA HAS OBTAINED ADDITIONAL DATA FROM THE 1989 MANGROVE STUDY. THIS DATA DEMONSTRATES THAT THE RELEASE OF LEACHATE FROM THE MUNISPORT LANDFILL REPRESENTS A SIGNIFICANT THREAT TO THE ENVIRONMENT. HENCE, EPA HAS DETERMINED THAT CERCLA REMEDIAL ACTION IS WARRANTED TO ABATE THE THREAT TO AQUATIC LIFE OF THE MANGROVE PRESERVE. EPA WILL RETAIN JURISDICTION OVER THE CERCLA REMEDIAL ACTION. BASED ON THE CURRENT EVIDENCE, EPA CONSIDERS THE REMAINING PORTION OF THE LANDFILL SIMILAR TO OTHER MUNICIPAL LANDFILLS OPERATED IN A SIMILAR TIME PERIOD AND, AS SUCH, SHOULD REMAIN UNDER STATE JURISDICTION AND PROPERLY CLOSED IN ACCORDANCE WITH FLORIDA LANDFILL CLOSURE RULES, CHAPTER 17-701, FAC. FDER HAS EXPRESSED STRONG INTEREST IN ENSURING THAT THIS LANDFILL IS CLOSED PROPERLY.

PUBLIC COGENT PERIOD

1. THE FLORIDA DIVISION OF THE IZAAK WALTON LEAGUE OF AMERICA, AND THE IZAAK WALTON LEAGUE, MANGROVE CHAPTER, COMMENTED THAT AN INADEQUATE COMMENT PERIOD WAS HELD FOR THE NOTICE OF CHANGE TO THE PROPOSED PLAN.

EPA RESPONSE: EPA HAS PROVIDED SIGNIFICANT OPPORTUNITIES FOR PUBLIC PARTICIPATION AT THIS SITE. AFTER THE FIRST PROPOSED PLAN A COMMENT PERIOD AND HEARING WERE HELD AND A SECOND COMMENT PERIOD WAS OFFERED FOR THE PUBLIC TO COMMENT ON THE PROPOSED CHANGE. THE AGENCY DOES NOT BELIEVE THAT A SECOND PUBLIC MEETING WAS REQUIRED DUE TO THE CHANGE IN THE PROPOSED PLAN. INDEED CERCLA SECTION 117(B) CONTEMPLATES THAT SIGNIFICANT CHANGES IN THE PROPOSED PLAN BE DISCUSSED IN THE

FINAL PLAN. IN THIS CASE, EPA WENT FURTHER AND PROVIDED THE PUBLIC AN OPPORTUNITY TO COMMENT ON THE PLAN BEFORE A FINAL DECISION WAS MADE AND INFLUENCED EPA TO CONDUCT FURTHER STUDIES. THIS SECOND COMMENT PERIOD IS CONSISTENT WITH EPA GUIDANCE (DRAFT GUIDANCE ON PREPARING SUPERFUND DECISION DOCUMENTS: PROPOSED PLAN AND ROD).

WHILE THE AGENCY APPRECIATES THE LEAGUE'S CONCERN FOR A LACK OF TIME FOR ADEQUATE COMMENT, SECTION 300.67 OF THE NCP (AT THE TIME OF THE COMMENT PERIOD (1988)) ONLY REQUIRED A COMMENT PERIOD AND PUBLIC MEETING FOR THE INITIAL RELEASE OF EPA'S PROPOSED PLAN. FURTHERMORE, EPA POLICY AND GUIDANCE AT THE TIME OF THE MEETING ONLY REQUIRED AN ADDITIONAL COMMENT PERIOD IN SITUATIONS WHERE EPA, THROUGH THE REVIEW OF COMMENTS ON THE PROPOSED PLAN OR FROM THE RECEIPT OF ADDITIONAL DATA, EPA SELECTS A REMEDY THAT WAS NOT PRESENTED AS AN ALTERNATIVE IN THE PROPOSED PLAN NOR WAS IT A LOGICAL OUTGROWTH FROM THE INFORMATION CONTAINED IN THE ADMINISTRATIVE RECORD (AR) FILE FOR THE SITE. SINCE THE ALTERNATIVE THAT THE AGENCY SELECTED WAS DISCUSSED IN THE PROPOSED PLAN AND SINCE THE CHANGE WAS BASED ON INFORMATION CONTAINED IN THE AR, EPA WAS ONLY REQUIRED TO DOCUMENT THE JUSTIFICATION FOR SELECTION OF A NEW REMEDY IN THE ROD. HOWEVER, DUE TO THE HIGH LEVEL OF PUBLIC INTEREST IN THIS SITE, THE AGENCY DETERMINED THAT IT WOULD BE APPROPRIATE TO NOTIFY THE PUBLIC OF THE SELECTION OF A NEW ALTERNATIVE AND TO ALLOW AN ADDITIONAL PERIOD FOR PUBLIC COMMENT. EPA HAS FULFILLED ALL STATUTORY OR REGULATORY REQUIREMENTS FOR PUBLIC COMMENT.

2. A REPRESENTATIVE OF THE IZAAK WALTON LEAGUE, MANGROVE CHAPTER, REQUESTED THAT A PUBLIC HEARING BE HELD SO THAT THE LEAGUE AND OTHER INTERESTED PARTIES COULD PRESENT THEIR POSITIONS REGARDING THE CHANGE IN EPA'S PROPOSED PLAN FOR CERCLA REMEDIAL ACTION.

EPA RESPONSE: THE LEAGUE REQUEST FOR A PUBLIC HEARING ON THE CHANGE IN ALTERNATIVES IS NOW MOOT. BASED ON NEW DATA COLLECTED BY EPA, THE AGENCY HAS DETERMINED THAT THE ORIGINAL PROPOSED PLAN AND THE CHANGE TO THE PLAN ARE NO LONGER AN APPROPRIATE RESPONSE PURSUANT TO CERCLA. THE AGENCY DEVELOPED AN ADDENDUM TO THE ORIGINAL FEASIBILITY STUDY AND NEW PROPOSED PLAN. THE PUBLIC WAS ALLOWED TO COMMENT ON THESE DOCUMENTS FOR 30 DAYS AND ALSO DISCUSS THEIR CONCERNS WITH EPA, FDER, DERM AND OTHER GOVERNMENT AGENCIES AT A PUBLIC MEETING HELD DURING THIS COMMENT PERIOD.

3. A REPRESENTATIVE OF THE IZAAK WALTON LEAGUE, MANGROVE CHAPTER, REQUESTED THAT EPA ISSUE A DRAFT OF THE ROD (BASED ON THE NO CERCLA REMEDIAL ACTION) BE ISSUED AND IT BE AVAILABLE FOR PUBLIC REVIEW AND COMMENT.

EPA RESPONSE: THE NCP AT THE TIME OF THE COMMENT PERIOD (NOVEMBER 1988) (AND THE CURRENT NCP) REQUIRED THAT EPA PUBLISH A PROPOSED PLAN BASED ON THE FINDINGS OF THE RI/FS AND IDENTIFY THE AGENCY'S PREFERRED ALTERNATIVE. THE AGENCY WAS NOT REQUIRED (NOR IS IT CURRENTLY REQUIRED) TO PROVIDE A COPY OF THE DRAFT ROD TO THE PUBLIC FOR REVIEW AND COMMENT. MOREOVER, PURSUANT TO EPA POLICY, DRAFT DOCUMENTS ARE CONSIDERED "PRE-DECISIONAL" AND NOT SUBJECT TO PUBLIC REVIEW.

PURSUANT TO CURRENT EPA GUIDANCE AND THE NCP, PUBLIC COMMENTS RECEIVED ON THE PROPOSED PLAN ARE REVIEWED BY THE AGENCY AND USED TO DEVELOP THE ROD. SIGNIFICANT CHANGES IN THE SELECTION OF THE PREFERRED ALTERNATIVE FROM THE PROPOSED PLAN ARE DOCUMENTED IN THE ROD ALONG WITH A SUMMARY OF HOW THE AGENCY RESPONDED TO THE PUBLIC'S COMMENTS ON THE PROPOSED PLAN.

PUBLIC HEALTH AND THE ENVIRONMENT

1. THE IZAAK WALTON LEAGUE OF AMERICA EXPRESSED A CONCERN THAT LEACHATE FROM THE LANDFILL DEGRADED THE QUALITY OF THE GROUNDWATER SUPPLY BENEATH THE LANDFILL.

EPA RESPONSE: THE AGENCY AGREES THAT LEACHATE FROM THE LANDFILL HAS IMPACTED THE QUALITY OF THE GROUNDWATER AT THE SITE. THE GROUNDWATER IN THE VICINITY OF THE MUNISPORT PROPERTY, HOWEVER, IS NOT USED AS A DRINKING WATER SOURCE DUE TO SALT WATER INTRUSION.

COMMENTS REGARDING THE MARCH 1990 PROPOSED PLAN

NATURAL RESOURCES DAMAGES

1. THE COUNSEL FOR THE CITY OF NORTH MIAMI REQUESTED AN ASSURANCE THAT THE AGENCY WOULD NOT SEEK NATURAL RESOURCES DAMAGES FROM THE CITY UNDER CERCLA OR ANY OTHER FEDERAL LAW, AND THAT NOAA CONCUR WITH THE ALTERNATIVE.

EPA RESPONSE: WHILE THE AGENCY HAS CONSULTED WITH AND RECEIVED CONCURRENCE FROM NOAA ON THE ROD, THE AGENCY DOES NOT HAVE THE AUTHORITY TO ASSURE THAT NO NATURAL RESOURCE DAMAGE CLAIMS WILL BE ASSESSED. PURSUANT TO SECTION 107(F)(1) OF CERCLA, THE PRESIDENT DELEGATES AUTHORITY TO PURSUE NATURAL RESOURCE DAMAGE CLAIMS. AS CONTAINED IN SECTION 300.600 OF THE NCP, THIS AUTHORITY HAS BEEN DELEGATED TO TWO FEDERAL TRUSTEES, THE DEPARTMENT OF COMMERCE (THROUGH NOAA) AND THE DEPARTMENT OF INTERIOR (DOI). TWO STATE TRUSTEES, FDER AND FDNR HAVE ALSO BEEN APPOINTED. AS SUCH, ONLY THE TRUSTEES HAVE THE JURISDICTIONAL AUTHORITY TO ASSESS OR SEEK NATURAL RESOURCE DAMAGE CLAIMS.

JURISDICTION AND NPL LISTING OF THE SITE

1. COUNSEL FOR THE CITY OF NORTH MIAMI EXPRESSED CONCERN REGARDING THE POTENTIAL PROBLEMS ASSOCIATED WITH A DUAL AUTHORITY ROLE (I.E., EPA AND FDER) REGARDING FUTURE RESPONSE ACTIONS AT THE SITE. THE COMMENTER EXPRESSED THAT DUAL AUTHORITY ULTIMATELY LEADS TO CONFLICTING REQUIREMENTS AND DIRECTIONS WHICH LEAD TO INCREASES IN COSTS.

EPA RESPONSE: EPA IS AWARE OF THE POTENTIAL PROBLEMS THAT MAY OCCUR IN DUAL AUTHORITY ROLES AND APPRECIATES THE COMMENTERS CONCERNS. ALTHOUGH SOME SITES REQUIRE A DUAL AUTHORITY ROLE TO ENSURE THAT THE APPROPRIATE ACTIONS ARE TAKEN TO EFFECT THE REMEDIAL ACTION, EPA HAS DETERMINED THAT DUAL AUTHORITY REGARDING THE RESPONSE ACTIONS AT THIS SITE IS NOT NECESSARY.

BASED ON THE RESULTS FROM THE 1988 RI AND THE 1989 MANGROVE STUDY, EPA HAS DETERMINED THAT THE RELEASE OF LEACHATE FROM THE MUNISPORT LANDFILL POSES A SIGNIFICANT THREAT TO THE ENVIRONMENT AND THAT CERCLA REMEDIAL ACTION TO ABATE THE THREAT IS WARRANTED. SINCE THE STUDIES AND AVAILABLE FILE INFORMATION DO NOT INDICATE THAT THE LANDFILL POSES A SIGNIFICANT THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT, EPA HAS DETERMINED THAT THE MOST APPROPRIATE ACTION WITH REGARD TO CLOSURE OF THE LANDFILL IS FOR IT TO BE CLOSED UNDER STATE LAW. THERE WILL BE TWO SEPARATE REMEDIAL ACTIONS TAKEN CONCURRENTLY AT THE SITE PURSUANT TO TWO SEPARATE AUTHORITIES. THEREFORE, PROBLEMS TYPICALLY ASSOCIATED WITH DUAL AUTHORITY ROLES SHOULD NOT OCCUR. FURTHERMORE, EPA WILL CONSULT WITH FDER TO ENSURE THAT THE TWO ACTIONS ARE COMPATIBLE AND NOT DUPLICATIVE.

2. COUNSEL FOR THE FLORIDA AUDUBON SOCIETY AND THE TROPICAL AUDUBON SOCIETY EXPRESSED CONCURRENCE WITH EPA'S DECISION NOT TO DELETE THE MUNISPORT SITE FROM THE NPL. COUNSEL, HOWEVER, DOES NOT CONCUR WITH EPA'S PLAN TO BIFURCATE THE JURISDICTIONAL RESPONSIBILITY FOR CLEANUP OF THE SITE BETWEEN FEDERAL AND STATE AUTHORITIES. COUNSEL REASONS THAT BY EPA ONLY ADDRESSING THE RELEASE OF LEACHATE AND NOT THE ACTUAL SOURCE OF LEACHATE, THE THREAT TO THE PUBLIC POSED BY THE LANDFILL WILL BE IGNORED. FINALLY, COUNSEL CONTENDS THAT BY ONLY RESPONDING TO THE RELEASE OF HAZARDOUS SUBSTANCES, EPA IS NOT FULFILLING ITS OBLIGATIONS UNDER CERCLA TO ALSO RESPOND TO THE THREAT OF RELEASE OF HAZARDOUS SUBSTANCES IN ADDITION TO ACTUAL RELEASES.

EPA RESPONSE: PURSUANT TO SECTION 104(1) OF CERCLA, EPA IS AUTHORIZED TO RESPOND TO THE RELEASE OF ANY HAZARDOUS SUBSTANCE OR IF THERE IS A SUBSTANTIAL THREAT OF RELEASE OF A HAZARDOUS SUBSTANCE TO THE ENVIRONMENT. HOWEVER, BASED ON A REVIEW OF EVIDENCE CONCERNING THE DISPOSAL OF HAZARDOUS WASTE AT THE MUNISPORT LANDFILL AND DATA COLLECTED DURING THE 1986-87 RI AND 1989 MANGROVE STUDY, EPA HAS DETERMINED A THAT THE LANDFILL DOES NOT REPRESENT A SIGNIFICANT THREAT

TO PUBLIC HEALTH OR THE ENVIRONMENT, NOR DO THE CONDITIONS REPRESENT A SUBSTANTIAL THREAT OF RELEASE TO THE ENVIRONMENT. THIS DETERMINATION WAS MADE IN CONSULTATION WITH THE EPA RISK ASSESSMENT OFFICER AND THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR). IN THE ABSENCE OF A SIGNIFICANT THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT POSED BY THE LANDFILL, EPA DETERMINED THAT THE MOST APPROPRIATE COURSE OF ACTION WOULD BE FOR FEDERAL RESPONSE TO THE RELEASE OF HAZARDOUS SUBSTANCES TO THE MANGROVE PRESERVE AND STATE RESPONSE REGARDING THE PROPER CLOSURE OF THE LANDFILL.

WITH REGARD TO THE PROPOSED METHOD TO RESPOND TO THE RELEASE OF HAZARDOUS SUBSTANCES IN THE MANGROVE PRESERVE, THE COMMENTER ALSO INDICATED THAT EPA WOULD BE REMISS BY ONLY RESPONDING TO THE RELEASE AND NOT ACTUALLY REMOVING THE SOURCE OF CONTAMINATION. BASED ON A REVIEW OF EXISTING WASTE DISPOSAL INFORMATION AND ANALYTICAL DATA FOR THIS SITE, EPA HAS DETERMINED THAT THE WASTE DISPOSED OF AT THIS LANDFILL IS CONSISTENT WITH THE TYPES OF WASTES (E.G., MUNICIPAL REFUSE) DISPOSED OF AT OTHER REGIONAL LANDFILLS OPERATED DURING SIMILAR TIME PERIODS. THE THREAT TO THE ENVIRONMENT RESULTS FROM THE RELEASE OF HAZARDOUS SUBSTANCES WHEREBY THE DECOMPOSITION OF ORGANIC WASTE IN THE LANDFILL (WHICH IS A NORMAL OCCURRENCE) IN COMBINATION WITH THE INAPPROPRIATE SITING OF THE LANDFILL IN A ENVIRONMENTALLY SENSITIVE AREA. THIS IS A UNIQUE SET OF CIRCUMSTANCES. AMMONIA, ALTHOUGH IT IS A NATURAL BYPRODUCT OF THE DECOMPOSITION OF ORGANIC MATERIALS, IS BEING RELEASED INTO AN AMMONIA SENSITIVE ENVIRONMENT AT TOXIC LEVELS. HOWEVER, THE CIRCUMSTANCE UNDER WHICH THIS RELEASE IS OCCURRING IS NOT NATURAL AND IS THE RESULT OF MAN-MADE ACTIVITIES.

SINCE EPA HAS ESTABLISHED THAT THE RELEASE OF LEACHATE FROM THE LANDFILL REPRESENTS A THREAT TO THE ENVIRONMENT AND THAT THE LANDFILL PROPER DOES NOT POSE A SIGNIFICANT THREAT TO PUBLIC HEALTH, THE AGENCY HAS DETERMINED THAT THE MOST APPROPRIATE RESPONSE ACTION IS TO COLLECT AND TREAT THE LEACHATE RELEASED FROM THE LANDFILL UNTIL THE DECOMPOSITION OF ORGANIC MATERIAL IN THE LANDFILL HAS PROGRESSED ENOUGH THAT THE LEACHATE IS NO LONGER TOXIC TO AQUATIC LIFE. ALTHOUGH THE REMOVAL OF THE SOURCE OF CONTAMINATION (I.E., REMOVAL OF THE LANDFILL) MAY APPEAR TO BE A MORE STRAIGHTFORWARD APPROACH, IT IS NOT THE MOST APPROPRIATE METHOD. REMOVAL OF GARBAGE FROM THE LANDFILL WOULD BE BY FAR THE LEAST COST EFFECTIVE OF THE REMEDIES CONSIDERED AND IS UNWARRANTED, ESPECIALLY IN THE ABSENCE OF A PUBLIC HEALTH THREAT.

3. COUNSEL FOR THE CITY OF NORTH MIAMI SUBMITTED A LETTER OUTLINING THE CITY'S REASONS FOR ASKING FOR A DELISTING OF THE SITE. THESE REASONS INCLUDED THE FOLLOWING:

- SCORING ERROR LED TO INITIAL LISTING ON NPL
- CASE LAW CITED AS PRECEDENT FOR CORRECTING SCORING ERROR
- CONGRESSIONAL DIRECTION CITED DURING SUPERFUND REAUTHORIZATION

EPA RESPONSE: PLEASE REFER TO SIMILAR COMMENTS AND RESPONSES FOR THE JULY 1988 COMMENT PERIOD (COMMENT NUMBER 4 UNDER JURISDICTION OF THE PROJECT).

4. COUNSEL FOR THE CITY OF NORTH MIAMI COMMENTED THAT THE CERCLA ACTION AT THE MANGROVE PRESERVE, AS PROPOSED BY EPA, WOULD BE IN CONFLICT WITH THE EXISTING CLEAN WATER ACT, SECTION 404(C) VETO AND THE 309(A) ORDER.

EPA RESPONSE: SECTION 404 OF THE CWA ESTABLISHES A PERMIT PROGRAM UNDER WHICH THE ARMY CORPS OF ENGINEERS (CORPS) IS AUTHORIZED TO ISSUE PERMITS FOR THE DISCHARGE OF DREDGE OR FILL MATERIAL AT SPECIFIED DISPOSAL SITES. SUCH SITES ARE TO BE SPECIFIED THROUGH APPLICATION OF THE CLEAN WATER ACT (CWA) SECTION 404(B)(L) CRITERIA DEVELOPED BY EPA. TO PROVIDE A CHECK ON THE PERMITTING AUTHORITY OF THE CORPS, SECTION 404(C) OF THE CWA ALLOWS EPA TO PROHIBIT, OR RESTRICT, OR WITHDRAW THE SPECIFICATION OF ANY DEFINED AREA AS A DISPOSAL SITE, WHERE EPA DETERMINES THAT

DISCHARGING AT THE SITE WOULD HAVE "UNACCEPTABLE ADVERSE EFFECTS" ON, INTERALIA, MUNICIPAL WATER SUPPLIES AND FISHERY AREAS. THUS, CWA SECTION 404(C) ESTABLISHES, IN EFFECT, AN "UNPERMITTING" PROCESS.

TO THE EXTENT THAT AN ACTION IS EXEMPT FROM FEDERAL PERMITTING REQUIREMENTS BY THE EXPRESS PROVISION OF CERCLA SECTION 121(E)(1), IT IS REASONABLE TO CONSIDER ANY CWA SECTION 404(C) PROHIBITION OR RESTRICTION ON PERMITTING AT THE SITE TO BE INEFFECTIVE. FURTHER, AS NOTED ABOVE, SECTION 404(C) RESTRICTIONS WERE INTENDED TO SERVE AS A MECHANISM FOR EPA TO LIMIT PERMITTING DECISIONS BY THE CORPS, IN THE CERCLA CONTEXT, IT IS EPA ITSELF THAT IS MAKING THE DECISION OF WHAT DREDGE OR FILL IF DISCHARGED ARE NECESSARY, AND WHETHER THERE WILL BE AN ADVERSE EFFECT FROM THOSE DISCHARGES.

HENCE, EPA HAS DETERMINED THAT IMPLEMENTATION OF THE CERCLA RESPONSE ACTION WILL NOT REQUIRE A MODIFICATION OF THE CWA SECTION 404(C) VETO. CLOSURE OF THE LANDFILL, HOWEVER, MAY BE SUBJECT TO THE VETO, AND IF NECESSARY, MAY REQUIRE A MODIFICATION OF THE SECTION 404(C) VETO. WITH REGARD TO THE CWA SECTION 309(A) ORDER, EPA MAY ELECT TO WITHDRAW THE ORDER IF THE AGENCY DETERMINES THAT THE INTENT OF THE ORDER WILL BE COMPLIED WITH BY THE PRPS THROUGH THE IMPLEMENTATION OF THE CERCLA RESPONSE ACTION.

PUBLIC HEALTH AND THE ENVIRONMENT

1. COUNSEL FOR THE CITY OF NORTH MIAMI INDICATED THAT EXISTING REPORTS DO NOT DEMONSTRATE A THREAT TO THE PUBLIC OR THE ENVIRONMENT. IN PARTICULAR, THE COGENT NOTED THE FOLLOWING POINTS:

1A. AMMONIA WAS THE ONLY HAZARDOUS SUBSTANCE FOUND IN PRESERVE.

EPA RESPONSE: THE AGENCY AGREES WITH THE COMMENTER THAT AMMONIA WAS THE ONLY HAZARDOUS SUBSTANCE FOUND AT SUFFICIENT CONCENTRATIONS TO EFFECT A SIGNIFICANT ENVIRONMENTAL THREAT. OTHER HAZARDOUS SUBSTANCES WERE DETECTED, BUT NOT AT LEVELS THAT CONSTITUTE A THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT. UNDER THE CLEAN WATER ACT (CWA) AND CERCLA, AMMONIA IS DEFINED AS A HAZARDOUS SUBSTANCE. THE RELEASE OF A HAZARDOUS SUBSTANCE IS SUBJECT TO CERCLA JURISDICTION.

1B. THE CITY PHOTOGRAPHIC AND VISUAL EVIDENCE INDICATES THAT THE PRESERVE IS A HEALTHY MANGROVE SYSTEM.

EPA RESPONSE: EPA AGREES THAT THE PHOTOS ARE OF LIVE MANGROVES AND THAT SMALL FISH WERE SIGHTED IN THE MANGROVE PRESERVE. WE DO NOT AGREE THAT THE PHOTOS AND FISH SIGHTINGS GIVES EVIDENCE THAT THE AQUATIC LIFE OF THE PRESERVE IS NOT THREATENED BY TOXIC CONCENTRATIONS OF THE LEACHATE.

EPA VIEWS THE MANGROVE PRESERVE AS AN INTEGRAL ECOLOGICAL COMPONENT OF THE LARGER MARINE SYSTEM OF BISCAYNE BAY. AS THE DAILY EXCHANGE OF TIDAL WATER TAKES PLACE BETWEEN THE PRESERVE AND BAY SO DOES AN EXCHANGE OF AQUATIC LIFE. THIS LIFE MASS IS COMPRISED OF MANY KINDS OF SPECIES FOUND IN VARIOUS LIFE STAGES OF DEVELOPMENT. A NUMERICAL PREPONDERANCE OF THE LIFE FORMS ARE EARLY LIFE FORMS SUCH AS FISH AND SHELLFISH EGGS, LARVAE, POST LARVAE, AND JUVENILES. SUCH AN ASSORTMENT IS COMMON SINCE A FUNCTION OF SHALLOW, MARINE ENVIRONMENTS IS TO PROVIDE SPAWNING AND NURSERY AREAS FOR A HOST OF ESTUARINE DEPENDENT SPECIES. THE ABUNDANCE AND DIVERSITY OF THESE ANIMALS FLUCTUATE YEARLY, SEASONALLY, AND EVEN DAILY BETWEEN NIGHT AND DAY. LITTLE IS KNOWN ON THE BASIS FOR THESE FLUCTUATIONS.

IN ADDITION TO THIS NATURAL TRANSIENT STATE, EACH KIND OF ANIMAL AND ITS ASSOCIATED LIFE STAGE SURVIVES WITHIN A RANGE OF PHYSICAL, CHEMICAL AND BIOLOGICAL CONSTRAINTS OF THEIR ENVIRONMENT. CHANGES IN THESE CONSTRAINTS WHETHER NATURALLY OR THROUGH POLLUTION, EFFECTS THE ANIMAL'S ABILITY TO SURVIVE. AS THE POLLUTION INCREASES, FOR EXAMPLE, THE ANIMAL IS ELIMINATED FROM THE ENVIRONMENT ACCORDING TO ITS SENSITIVITY TO THE POLLUTANT. THOSE ANIMALS LESS SENSITIVE TO THE

POLLUTION THAT SURVIVE MAY EVEN INCREASE IN ABUNDANCE.

FOR THESE REASONS, A CASUAL OBSERVATION IS NOT ADEQUATE TO JUDGE THE HEALTH OF A PLANT AND ANIMAL COMMUNITY LIKE THE MANGROVE PRESERVE. THOSE ANIMALS OR PLANTS SIGHTED MAY ONLY REPRESENT THE SURVIVORS AND NOT THE ORIGINAL COMMUNITY.

1C. THE CITY OF NORTH MIAMI COMMENTED THAT THE BIOASSAYS UNDERTAKEN IN THE PRESERVE STUDY WERE SO FLAWED AS TO PROVIDE NO RELIABLE INDICATION OF ANY ADVERSE IMPACT ON AQUATIC LIFE IN THE PRESERVE FROM LEACHATE AMMONIA. THE CITY IDENTIFIES THESE FLAWS AS 1) THE TEST SPECIES WERE NOT ENDEMIC TO THE PRESERVE, 2) SALINITY STRESS IN THE ACUTE TOXICITY TESTS WITH MENIDIA, 3) RESIDUAL HYDROGEN SULFIDE IN THE SITE SAMPLES WAS NOT ACCOUNTED FOR AT THE TIME OF TOXICITY TESTING, 4) THE NATURAL ENVIRONMENT OF ANY MANGROVE SYSTEM IS NOT HOSPITABLE TO NON-MATURE, SENSITIVE AQUATIC LIFE.

EPA RESPONSE: RESULTS OF THE PRESERVE STUDY DEMONSTRATES THAT AMMONIA CONCENTRATIONS IN THE WESTERN REGION OF THE PRESERVE EXCEEDED NATIONAL WATER QUALITY CRITERIA. THIS CRITERIA WAS BASED UPON RESULTS FROM THE STANDARDIZED TOXICITY BIOASSAYS WHICH INVOLVED MULTIPLE TEST SPECIES AND SENSITIVITIES TO AMMONIA. THE CRITERIA WAS ESTABLISHED TO BE PROTECTIVE OF 95 PERCENT OF ALL MARINE LIFE INCLUDING SENSITIVE SPECIES. AS INDICATED IN THE PREVIOUS RESPONSE, MULTIPLE SPECIES OF AQUATIC ANIMALS AND LIFE STAGES CAN BE EXPECTED TO UTILIZE THE MANGROVE PRESERVE.

THE METHODS USED TO ASSESS TOXICITY IN THE PRESERVE STUDY WERE THE SAME STANDARDIZED PROTOCOL USED TO ESTABLISH NATIONAL CRITERIA. THE SELECTION OF TEST SPECIES WAS FROM THE EPA ESTABLISHED SUITE OF APPROVED TEST SPECIES FOR MARINE BIOASSAYS. THE FACT THAT THE SELECTED TEST SPECIES ARE FOUND OR NOT FOUND AS ENDEMIC POPULATIONS OF THE MANGROVE PRESERVE IS NOT AN ISSUE IN EPA'S TOXIC CONTROL POLICIES. THE SELECTED SPECIES ARE VIEWED BY EPA AS A "WHITE RAT" TEST ORGANISM. THEIR SENSITIVITY TO POLLUTIONAL EFFECTS, ABILITY TO BE CULTURED, AND SUITABILITY TO LABORATORY TESTING ARE THE OVER-RIDING REASONS FOR THEIR USE IN THE TOXICITY TESTS. THE PURPOSE OF USING MULTIPLE SPECIES IN THE BIOASSAYS WAS TO ATTEMPT TO ASSURE THAT THE MOST SENSITIVE SPECIES ARE EVALUATED. WITH THIS EVALUATION, IT IS ASSUMED BY EPA THAT THIS TEST SPECIES REPRESENTS THE MOST SENSITIVE SPECIES OR GROUP OF SPECIES FOUND ANYWHERE AND ANYTIME IN THE MANGROVE PRESERVE. THESE SENSITIVE SPECIES WOULD INCLUDE ANY LIFE STAGE WHETHER IT BE AN EGG, LARVAE, POST LARVAE, JUVENILE, OR ADULT FISH, SHELLFISH, OR OTHER INVERTEBRATES.

THE SPECIES MENIDIA BERYLINNA WHICH WAS USED IN THE BIOASSAYS IS RECOGNIZED AS A COMMON FORAGE FISH IN COASTAL MARINE WATERS. THE SPECIES IS EURYHALINE THUS CAPABLE OF SURVIVING IN WIDE RANGING CONDITIONS OF SALINITY. THE BATCH OF FISH (10 TO 14 DAYS OLD) USED IN THE BIOASSAYS WERE INITIALLY CULTURED AND SHIPPED TO EPA IN SALTWATER WITH A SALINITY OF 25 PPT. THE BIOASSAYS WERE CONDUCTED WITH SAMPLES FROM THE PRESERVE HAVING A SALINITY RANGING FROM 31 TO 36 PPT. PERFORMANCE CONTROLS WERE ALSO CONDUCTED WITH MARINE WATER OF 25 AND 36 PPT SALINITY. THE 11 PPT SALINITY DIFFERENTIAL BETWEEN THE CONTROLS WAS OF NO APPARENT CONSEQUENCE TO SURVIVAL. THE CITY VIEWS THAT IN THE ABSENCE OF ACCLIMATING THE FISH TO THE GREATER RANGE OF SALINITY, THE DIFFERENTIAL BETWEEN 25 PPT AND THE SITE SAMPLE RANGE OF 31 TO 36 PPT AS POSSIBLY EFFECTING OSMOREGULATORY STRESS IN THE TEST FISH THUS MAKING THEM MORE SUSCEPTIBLE TO AMMONIA TOXICITY. EPA DOES NOT CONCUR WITH THIS VIEW IN LIGHT OF THE NATURAL EURYHALINE CHARACTERISTICS OF THE SPECIES AND THE FACT THAT NO EFFECT WAS SEEN IN THE CONTROL TESTS.

REGARDING TOXICITY DUE TO RESIDUAL HYDROGEN SULFIDE IN THE BIOASSAY SAMPLES, EPA BELIEVES THERE IS NO BASIS FOR THIS CONCERN. HYDROGEN SULFIDE IS THE MOST REDUCED FORM OF SULFUR AND IS SUBJECT TO RAPID OXIDATION IN THE PRESENCE OF ANY DISSOLVED OXYGEN. THE CITY OVERLOOKS THE FACT THAT THE SURFACE WATERS TESTED WERE NOT ALWAYS ABSENT OF DISSOLVED OXYGEN. SAMPLES COLLECTED FROM THE PRESERVE AND SHIPPED TO THE ATHENS LABORATORY (ABOUT 24-HOUR TRANSIENT TIME) WERE ALL AEROBIC. THE SAMPLES UPON THEIR PREPARATION FOR TESTING NEVER YIELDED ANY ODORS INDICATING THE PRESENCE OF HYDROGEN SULFIDE. EPA BELIEVES HYDROGEN SULFIDE WAS OF NO CONSEQUENCE TO THE

OBSERVED TOXICITY OF THE SAMPLES.

EPA AGREES THAT "NON-MATURE" MENIDIA WERE USED IN THE TOXICITY TESTING. HOWEVER, WE FAIL TO UNDERSTAND HOW THE RESULTS OF THE TOXICITY TESTS CORROBORATES THE CITY'S NOTION THAT THE NATURAL ENVIRONMENT OF ANY MANGROVE SYSTEM IS NOT HOSPITABLE TO "NON-MATURE", SENSITIVE AQUATIC LIFE FORMS. THE BLACK POINT MANGROVE SYSTEM, BY ANY MEASURE, IS A GOOD EXAMPLE OF NATURAL MANGROVE SYSTEM WHERE NO TOXIC EFFECTS WERE MEASURED IN THE ATHENS TESTS.

1D. THE CITY INDICATES THAT TOXICITY IN THE PRESERVE IS ASSOCIATED WITH AN UNKNOWN POLLUTANT FROM THE BAY, AND THE PRESENCE OF TWO INADEQUATELY SIZED CULVERTS.

EPA RESPONSE: EPA IS EQUALLY DISTURBED WITH THE TOXICITY A FINDINGS WHICH SHOW TOXIC CONDITIONS IN REFERENCE SITES. HOWEVER, THESE FINDINGS CANNOT POSSIBLY SUPPORT THE CITY'S VIEW THAT THE TOXICITY WAS DUE TO "BACK-WATER" CONDITIONS WHICH NATURALLY RESULT IN LOW DISSOLVED OXYGEN, HIGH HYDROGEN SULFIDE AND HIGH AMMONIA CONCENTRATIONS. THIS IS NOTHING LESS THAN SPECULATION ON THE PART OF THE CITY. FIRST, A DISSOLVED OXYGEN OR HYDROGEN SULFIDE WERE NOT REPORTED FOR ANY OF THE THREE TOXIC REFERENCE SITES. AMMONIA WAS, HOWEVER, INTENSELY MONITORED WHICH SHOWED ONLY TRACE LEVELS OF THIS SUBSTANCE IN THESE WATERS.

EPA REMAINS CONCERNED ABOUT THE OBSERVED TOXICITY ASSOCIATED WITH THE REGIONAL WATERS OF BISCAYNE BAY. HOWEVER, WE VIEW THIS AS A DIFFERENT ENVIRONMENTAL PROBLEM FROM THAT OF THE MANGROVE PRESERVE.

1E. THE CITY ARGUES THAT THE CAUSE OF THE OBSERVED TOXICITY IN THE MANGROVE PRESERVE STUDY RESULTS FROM AN AREA-WIDE POLLUTANT OR COMBINATION OF POLLUTANTS AND NOT THE MUNISPORT LANDFILL. THIS VIEW IS BASED ON THE CONTENTION THAT TOXIC EFFECTS WERE COMPARABLE BETWEEN THE MANGROVE PRESERVE AND THE THREE TOXIC REFERENCE SITES.

EPA RESPONSE: EPA VIEWS THE TOXICITY ISSUE OF THE REFERENCE SITES AS AN ENVIRONMENTAL PROBLEM BUT SEPARATE FROM THE MANGROVE PRESERVE. THE AGENCY DOES NOT DISPUTE THE IDEA THAT THE TOXICITY OF BISCAYNE BAY MAY CONTRIBUTE TO THE PRESERVE PROBLEM; HOWEVER, EPA CONCLUDED FROM THE MANGROVE PRESERVE STUDY THAT THE OBSERVED TOXICITY IN THE PRESERVE WAS DUE PRIMARILY TO LANDFILL LEACHATE.

AS INDICATED PREVIOUSLY, EPA HAS NO RESERVATIONS THAT THE AMMONIA CONCENTRATIONS REPORTED IN THE WESTERN REGION OF THE PRESERVE ARE A PRODUCT OF LANDFILL LEACHATE EMERGING IN THE SURFACE WATERS OF THE PRESERVE. OTHER SOURCES OF AMMONIA ARE OF NO SIGNIFICANT CONSEQUENCES TO THE OBSERVED AMMONIA REGIME. IN FIGURE 31 OF THE PRESERVE STUDY REPORT, THE RELATIONSHIP BETWEEN AMMONIA CONCENTRATION AND TOXICITY CLEARLY DEMONSTRATED A HIGH CORRELATION COEFFICIENT. THE AMMONIA CONTENT OF SURFACE WATERS IN THE PRESERVES FOLLOWS AN INCREASING CONCENTRATION GRADIENT FROM THE BAY TO THE WESTERN BOUNDARY OF THE PRESERVE AND THE LANDFILL (SEE PREVIOUS RESPONSE).

THE TOXIC RESPONSE TO THIS AMMONIA OR LEACHATE GRADIENT IS FURTHER INDICATED IN FIGURE 18 OF THE PRESERVE STUDY WHICH SHOWS THE TOXIC EFFECTS AS IT IS DISTRIBUTED AT LOW TIDE, THE TIME WHEN RESIDUAL BAY WATER IS MINIMALLY PRESENT IN THE PRESERVE. AT LOW TIDE, THE TOXICITY OF BISCAYNE BAY WAS SIGNIFICANTLY LESS THAN REPORTED FOR THE PRESERVE (TABLE 12 OF PRESERVE STUDY REPORT). THE CITY CONTENDS THAT THE TOXICITY RESULTS WERE COMPARABLE BETWEEN THE PRESERVE AND BAY. THEY ARE NOT. AT HIGH TIDE, TOXICITY WAS GREATLY REDUCED FROM THAT OBSERVED DURING LOW TIDE SAMPLING BY THE INFLOW OF BAY WATER. CLEARLY, WATER FROM BISCAYNE BAY INTERACTS AND DIMINISHES THE TOXICITY ASSOCIATED WITH THE MANGROVES HENCE THE BAY IS VIEWED AS A MEDIATOR TO TOXICANTS IN THE MANGROVE PRESERVE.

1F. MUNISPORT LANDFILL IS NOT A SIGNIFICANT CONTRIBUTOR TO AMMONIA LEVELS OBSERVED IN THE PRESERVE. CONCENTRATIONS FOUND IN THE PRESERVE ARE DERIVED FROM IN-SITU DECOMPOSITION OF

MANGROVE DETRITUS. THE "BACKWATER" CONDITION AND POOR CIRCULATION OF THE PRESERVE ENHANCE THE PRODUCTION OF SUCH HIGH CONCENTRATIONS OF AMMONIA. THE REPORTED CONCENTRATIONS OF AMMONIA IN THE PRESERVE ARE OF THE SAME MAGNITUDE FOUND WORLD-WIDE IN MANGROVE SYSTEMS.

EPA RESPONSE: THE CITY CONTENDS THAT THE RANGE AND AVERAGE CONCENTRATION OF AMMONIA IN THE LANDFILL ARE LESS THAN NORMAL WHEN COMPARED TO OTHER LANDFILLS AND THAT THE AVERAGE IS TOO LOW TO SUPPORT THE REPORTED CONCENTRATION IN THE PRESERVE. A READING OF THE SITE RI WILL SHOW THAT THE DISTRIBUTION OF AMMONIA IN THE SITE IS EXTREMELY UNEVEN WHICH SIMPLY MEANS THAT THE GARBAGE WAS NOT UNIFORMLY SPREAD AND THAT "HOT SPOTS" OF AMMONIA HAVE DEVELOPED. BECAUSE OF THIS HAPHAZARD DISTRIBUTION, THE MOVEMENT OF SITE LEACHATE AND THE ASSOCIATED AMMONIA WOULD NOT TRAVEL IN A BROAD FRONT WITH UNIFORM OR AVERAGE CONCENTRATION OF AMMONIA EMERGING IN THE PRESERVE. AS SHOWN IN FIGURE 9 OF APPENDIX A IN THE PRESERVE STUDY REPORT AND IN FIGURE 10 OF THE REPORT, THE GREATEST CONCENTRATIONS OF AMMONIA IN PRESERVE IS SKEWED TO THE AREA OF STATION D6. THIS SKEWED CONDITION INDICATES THAT THE AMMONIA REGIME IS NOT A FUNCTION OF AVERAGE CONDITIONS IN THE SITE.

EPA WOULD AGREE THAT AMMONIA PRODUCTION VIA THE ANAEROBIC DECOMPOSITION OF DETRITUS IS A NORMAL BIOLOGICAL PROCESS OF MANGROVE SYSTEMS INCLUDING THOSE SAMPLED IN THE PRESERVE STUDY; HOWEVER, EPA DISAGREES THAT IN-SITU PROCESSES OF AMMONIA GENERATION EXPLAINS THE AMMONIA REGIME OF THE PRESERVE.

TABLE 9 OF APPENDIX A PROVIDES THE RESULTS OF SYNOPTIC SAMPLING OF SURFACE WATERS THROUGHOUT THE PRESERVE AREA. THE SAMPLING INCLUDED "BACKWATER" AND "FOREWATER" AREAS OF BOTH THE WESTERN AND EASTERN REGIONS OF THE PRESERVE. CLEARLY FROM THESE DATA, PRONOUNCED GRADIENT OF DECREASING CONCENTRATIONS OF AMMONIA EXTENDED FROM THE WESTERN TO THE EASTERN BOUNDARIES OF THE PRESERVE. THE ONLY FEATURE THAT DISTINGUISHES THE WESTERN AREA FROM THE EASTERN AREA OF THE PRESERVE IS THE PROXIMITY OF THE LANDFILL. IN THIS CASE THE LANDFILL FRONTS THE WESTERN EDGE OF THE PRESERVE. TO ASSUME THE WESTERN REGION OF THE PRESERVE IS BETTER SUITED FOR AMMONIA PRODUCTION THAN THE EASTERN REGION IS NOT JUSTIFIED SINCE BOTH AREAS SHARE THE SAME TIDAL CIRCULATION AND MANGROVE COMMUNITY.

FINALLY, THE SAMPLING OF SURFACE WATERS IN MANGROVE AREA OUTSIDE OF THE PRESERVE (BISCAYNE CREEK, DANIA CANAL, AND BLACK POINT) CONFIRM THAT IN-SITU GENERATION OF AMMONIA RESULTS IN CONCENTRATIONS GROSSLY LESS THAN OBSERVED IN THE WESTERN REGION OF THE PRESERVE. THESE REFERENCED SYSTEMS WERE SAMPLED HOURLY FOR AT LEAST 24 HOURS. OF THE 72 PLUS SAMPLES, ONLY ONE SAMPLE YIELDED A CONCENTRATION SUFFICIENTLY HIGH ENOUGH TO BE ABOVE THE ANALYTICAL DETECTION LEVEL. THAT ONE SAMPLE MEASURED 0.1 PPM WHICH IS TWO ORDERS-OF-MAGNITUDE LESS THAN THE HIGHEST VALUE OBSERVED IN THE WESTERN REGION OF THE PRESERVE.

FROM THESE FINDINGS, EPA CAN ONLY CONCLUDE THAT THE MUNISPORT SITE IS THE PRINCIPLE SOURCE OF AMMONIA FOUND IN THE PRESERVE.

2. COUNCIL FOR THE CITY OF NORTH MIAMI CONTENDED THAT RESTRICTED TIDAL CIRCULATION IN THE MANGROVE PRESERVE LIKELY CAUSES THE REPORTED TOXICITY. FURTHER, THE IMPAIRED TIDAL CIRCULATION WILL RESTRICT THE TYPES OF MARINE ORGANISMS THAT LIVE IN THE MANGROVE PRESERVE, EVEN IN THE ABSENCE OF HIGH LEVELS OF AMMONIA.

EPA RESPONSE: THE UNDERSIZED CULVERTS RESTRICT ONLY THE HIGH WATER PORTION OF THE TIDE CYCLE. HIGH TIDE REPRESENTS THE PERIOD OF LIMITED TOXIC IMPACT IN THE PRESERVE. CONVERSELY, LOW TIDE REPRESENTS THE PERIOD OF HIGHEST TOXIC RESPONSE. THE CULVERTS IMPOSED NO RESTRICTION TO LOW WATER DYNAMICS.

EPA RECOGNIZES THOUGH THAT THE APPARENT TIDAL RESTRICTIONS EFFECTED BY THE UNDERSIZED CULVERTS IMPAIRS THE FULL DEVELOPMENT OF THE DISSOLVED OXYGEN BUDGET. FURTHER, WE ALSO RECOGNIZE THAT

THE HIGH CONCENTRATIONS OF AMMONIA NOT ONLY ARE TOXIC TO AQUATIC LIFE, BUT ALSO EFFECTS A LARGE DISSOLVED OXYGEN DEMAND, VIA THE NITRIFICATION PROCESSES. CHEMICALS, ONE MG/L AMMONIA, IS EQUIVALENT TO 4.57 MG/L CARBONACEOUS BIOLOGICAL OXYGEN DEMAND. THE PROPOSED CERCLA REMEDIATION WILL MITIGATE THE TOXIC EFFECTS OF AMMONIA, REDUCE THE DISSOLVED OXYGEN DEMAND ASSOCIATED WITH THE NITRIFICATION PROCESS, AND REMOVE THE RESTRICTING EFFECT OF THE UNDERSIZED CULVERTS.

3. COUNSEL FOR THE CITY OF NORTH MIAMI COMMENTED THAT CERCLA RESPONSE DUE TO A RELEASE OF AMMONIA, A NATURALLY OCCURRING SUBSTANCE, IS NOT APPROPRIATE. SECTION 104(A)(3)(A) OF CERCLA PROHIBITS ACTIONS IN RESPONSE TO THE RELEASE OR THREAT OF RELEASE "OF A NATURALLY OCCURRING SUBSTANCE IN ITS UNALTERED FORM, OR ALTERED SOLEY THROUGH NATURALLY OCCURRING PROCESSES OR PHENOMENA, FROM A LOCATION WHERE IT IS NATURALLY FOUND".

EPA RESPONSE: WHILE AMMONIA IS A NATURALLY OCCURRING SUBSTANCE, IT IS BEING RELEASED UNDER CIRCUMSTANCES THAT ARE NOT NATURALLY OCCURRING IN THAT ENVIRONMENT (I.E., MUNICIPAL LANDFILLS DO NOT NATURALLY OCCUR ADJACENT TO MANGROVE SWAMPS). IN THE ABSENCE OF THE LANDFILL, IT WOULD STAND TO REASON THAT AMMONIA WOULD NOT BE PRESENT IN THE MANGROVE PRESERVE AT CONCENTRATIONS TOXIC TO AQUATIC LIFE. HENCE, EPA HAS DETERMINED THAT REMEDIAL ACTION PURSUANT TO SECTION 104(A) (1) OF CERCLA IS NECESSARY AND APPROPRIATE IN ORDER TO A ABATE THE THREAT TO THE ENVIRONMENT.

RECORD OF DECISION

1. COUNSEL FOR THE CITY OF NORTH MIAMI REQUESTED THAT EPA INCLUDE IN ITS PROPOSED PLAN AND RECORD OF DECISION ALL OF THE CITY'S CORRESPONDENCE AND RECORDS OF COMMUNICATION WITH EPA CONCERNING THE MUNISPORT LANDFILL.

EPA RESPONSE: PURSUANT TO EPA GUIDANCE AND POLICY ALL WRITTEN AND ORAL CORRESPONDENCE RELATED TO THE DEVELOPMENT OF EPA'S DECISION, INCLUDING THE PROPOSED PLAN AND THE ROD, IS MAINTAINED IN AN ADMINISTRATIVE RECORD (AR) FILE FOR THIS SITE. THE AR FOR THIS SITE IS MAINTAINED IN A LOCAL REPOSITORY AT THE CITY OF NORTH MIAMI PUBLIC LIBRARY AND THE EPA RECORDS CENTER IN ATLANTA. ACTUAL INCLUSION OF THESE RECORDS IN THE PROPOSED PLAN OR ROD DOCUMENTS IS THEREFORE, NOT NECESSARY.

REMEDIAL INVESTIGATION AND REMEDIAL ACTION ALTERNATIVES

1. A REPRESENTATIVE OF THE MUNISPORT DUMP COALITION AND THE FRIENDS OF THE OLETA RIVER, EXPRESSED CONCERN ABOUT EFFECTS OF AIR EMISSIONS ASSOCIATED WITH AIR STRIPPING AND WANTED TO KNOW IF CHLORINE WOULD BE REQUIRED FOR AMMONIA REMOVAL.

EPA RESPONSE: AIR STRIPPING AND CHEMICAL OXIDATION WITH CHLORINE WERE TWO OF THE PHYSICAL/CHEMICAL TREATMENT OPTIONS PRESENTED IN THE DRAFT FEASIBILITY STUDY ADDENDUM. EPA CURRENTLY FAVORS AIR STRIPPING OVER CHEMICAL OXIDATION WITH CHLORINE FOR REMOVAL OF AMMONIA DUE TO THE POTENTIAL THREAT TO AQUATIC BIOTA ASSOCIATED WITH THE USE OF CHLORINE. ON THE BASIS OF EXPERIENCE FROM OTHER INSTALLATIONS, AMBIENT AMMONIA CONCENTRATIONS WOULD BE ORDERS OF MAGNITUDE BELOW LEVELS WHICH COULD REPRESENT A HEALTH THREAT. BENCH OR PILOT TESTING WILL BE CONDUCTED PRIOR TO THE FINAL SELECTION OF A TREATMENT ALTERNATIVE TO ASSESS RISK TO HUMAN HEALTH CAUSED BY AIRBORNE RELEASE OF AMMONIA.

2. COUNSEL FOR THE CITY OF NORTH MIAMI INDICATED THAT THE CITY CONTINUES TO MAINTAIN THAT THE "NO ACTION" ALTERNATIVE IS THE APPROPRIATE ACTION TO BE TAKEN.

EPA RESPONSE: THE 1988 RI/FS DEMONSTRATED THAT THE RELEASE OF HAZARDOUS SUBSTANCES DID NOT PRESENT A THREAT TO PUBLIC HEALTH OR WELFARE. THE THREAT THAT THIS RELEASE REPRESENTS TO THE ENVIRONMENT, HOWEVER, WAS INCONCLUSIVE. BASED ON THE COMMENTS FROM FEDERAL AGENCIES,

ENVIRONMENTAL ACTION GROUPS AND LOCAL RESIDENTS WHO EXPRESSED CONCERN THAT THE SITE MAY PRESENT A THREAT TO THE ENVIRONMENT, EPA CONDUCTED A WATER QUALITY AND TOXIC ASSESSMENT. THIS STUDY WAS DESIGNED TO SPECIFICALLY EVALUATE THE ENVIRONMENTAL THREAT THAT THE SITE MAY PRESENT TO AQUATIC LIFE IN THE MANGROVE PRESERVE.

THIS PRESERVE IS PART OF THE STATE OF FLORIDA BISCAYNE BAY AQUATIC PRESERVE WHICH WAS ESTABLISHED PURSUANT TO CHAPTER 18-18.001 OF THE FLORIDA ADMINISTRATIVE CODE. THE RESULTS OF THE STUDY DEMONSTRATED THAT LEACHATE MIGRATING FROM THE LANDFILL INTO THE MANGROVE PRESERVE PRESENTS A SIGNIFICANT THREAT TO AQUATIC LIFE. THE STUDY ALSO CONCLUDED THAT, IF MEASURES WERE NOT TAKEN TO ABATE THE THREAT, THE TOXIC LEACHATE WOULD SEVERELY IMPAIR THE ECOLOGICAL FUNCTIONS OF THE PRESERVE AND PRECLUDE DEVELOPMENT AND MAINTENANCE OF A BALANCED ECOLOGICAL COMMUNITY OF AQUATIC BIOTA.

ON THIS BASIS, EPA HAS DETERMINED THAT REMEDIAL ACTION IS WARRANTED PURSUANT TO SECTION 104 OF CERCLA AS AMENDED BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986. THE "NO ACTION" ALTERNATIVE WAS INCLUDED IN THE DRAFT FEASIBILITY STUDY ADDENDUM AS MANDATED. CERCLA REQUIRES THAT A "NO ACTION" ALTERNATIVE BE EVALUATED AT EVERY SITE TO ESTABLISH A BASELINE FOR COMPARISON. IMPLEMENTATION OF THE "NO ACTION" ALTERNATIVE IN THIS SITUATION, HOWEVER, IS NOT APPROPRIATE.

3. COUNSEL FOR THE CITY OF MIAMI REQUESTED THAT THE HYDRAULIC BARRIER DEVELOPED BY THE TECHNICAL ADVISORY COMMITTEE (TAC) SHOULD BE INCLUDED WHEN CONSIDERING ALTERNATIVES.

EPA RESPONSE: BOTH THE POSITIVE HYDRAULIC BARRIER PROPOSED BY THE TAC AND THE NEGATIVE BARRIER IN ALTERNATIVE 3 ARE CONSIDERED TO BE CONCEPTUALLY FEASIBLE. BOTH OF THESE ALTERNATIVES WILL BE CONSIDERED DURING THE CONCEPTUAL DESIGN PHASE OF THE PROJECT.

PREFERRED REMEDIAL ACTION ALTERNATIVE

1. A LOCAL RESIDENT AND MEMBER OF THE FRIENDS OF OLETA RIVER, ASKED IF AND HOW OFTEN THE TREATMENT SYSTEM WILL BE MONITORED TO ASSESS THE EFFICIENCY OF THE SYSTEM.

EPA RESPONSE: SEMIANNUAL TESTING, IN THE DRY AND WET SEASONS, HAS BEEN RECOMMENDED BY FDER. ANALYSIS WOULD INCLUDE METALS AND OTHER POTENTIAL CONTAMINANTS. AS DISCUSSED IN THE ROD, QUARTERLY TESTING DURING THE START OF THE REMEDIAL ACTION WILL ALSO BE REQUIRED. PARAMETERS EVALUATED WILL INCLUDE AMMONIA, CHLORIDES AND CONDUCTIVITY.

2. COUNSEL FOR THE CITY OF NORTH MIAMI QUESTIONED THE SELECTION OF RECOVERY WELLS TO INTERCEPT THE LEACHATE PLUME.

EPA RESPONSE: THE STATEMENT QUOTED FROM THE ADDENDUM; "RECOVERY WELL SYSTEMS ARE THE MOST VERSATILE AND FLEXIBLE OF THE THREE GROUNDWATER RECOVERY CONCEPTS EVALUATED HEREIN", IS NOT AN EXPRESSION OF BIAS. IT IS A FACTUAL STATEMENT BASED ON AN EVALUATION OF POTENTIALLY APPLICABLE GROUNDWATER RECOVERY STRATEGIES. SITE HYDROGEOLOGIC CONDITIONS MAKE INTERCEPTOR TRENCHES OR DITCHES LESS SUITABLE THAN WELLS FOR CREATING A HYDRAULIC BARRIER AND CAPTURING CONTAMINATED GROUNDWATER AS ENVISIONED IN THE PREFERRED ALTERNATIVE. TRENCHES, HOWEVER, MAY BE EQUALLY AS SUITABLE AS WELLS FOR CREATING THE HYDRAULIC BARRIER PROPOSED IN THE TAC ALTERNATIVE.

3. COUNSEL FOR THE CITY OF NORTH MIAMI EXPRESSED A CONCERN WITH THE IMPACT OF RECOVERY WELL OPERATION ON SALINE INTRUSION AT THE SITE.

EPA RESPONSE: THE STRATEGY OF RECOVERY WELL DESIGN, WITH RESPECT TO WELL DEPTH, IS TO COMPLETE THE WELLS TO THE SHALLOWEST DEPTH POSSIBLE CONSISTENT WITH EFFECTIVE CAPTURE OF LEACHATE. THE INTENT IS TO MINIMIZE THE SALINITY OF THE INTERCEPTED GROUNDWATER, BUT ALSO BE CONSISTENT WITH

MAXIMUM LEACHATE CAPTURE. THE REASON FOR THIS CONCERN IS THAT THE SALINITY OF THE CAPTURED LEACHATE WILL HAVE AN IMPACT ON THE COSTS OF TREATMENT AND ULTIMATE DISPOSAL OF THE TREATED WATER. IT IS ACKNOWLEDGED THAT THE WORKABILITY OF ALTERNATIVE 3 MAY ULTIMATELY DEPEND ON THE ABILITY TO CAPTURE RELATIVELY LOW SALINITY LEACHATE AT THE PRESERVE BOUNDARY.

4. THE FLORIDA DEPARTMENT OF NATURAL RESOURCES OBJECTED TO THE OPTION OF DISPOSING TREATED LEACHATE TO THE SOUTHERN CANAL CITING FLORIDA STATUTES CHAPTER 258.397.

EPA RESPONSES: THE PROPOSED PLAN DID LIST THE SOUTHERN CANAL AS AN OPTION FOR DISCHARGING TREATED EFFLUENT. THE DISPOSAL OPTIONS CONTAINED IN THE ROD CONTEMPLATE DISCHARGE TO GROUNDWATER OR SURFACE WATER. THE APPROPRIATE METHOD OF DISCHARGE WILL BE SELECTED ON THE BASIS OF DATA COLLECTED FROM THE HYDROLOGIC STUDY. AN ADDITIONAL CRITERIA USED IN THE SELECTION OF DISCHARGE IS THAT IT COMPLY WITH ALL FEDERAL AND STATE WATER QUALITY STANDARDS.

5. A REPRESENTATIVE OF THE FRIENDS OF THE OLETA RIVER EXPRESSED THE FOLLOWING CONCERNS:

- THE REMEDIAL ACTION ALTERNATIVE SELECTION WAS DETERMINED BY ECONOMIC CONSIDERATIONS AND INCOMPLETE INFORMATION.
- THE DISCHARGE OF TREATED EFFLUENT WOULD BE TO THE MANGROVE PRESERVE.
- THERE ARE UNKNOWN COMPOUNDS IN THE LEACHATE THAT MAY NOT BE TREATED BY AERATION.
- THE CLEANUP WOULD NOT BEGIN SOON.

EPA RESPONSE: THE SECTION EVALUATES THE PERFORMANCE OF THE ALTERNATIVES AGAINST THE NINE CRITERIA SPECIFIED IN THE EPA DOCUMENT GUIDANCE FOR CONDUCTING REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDIES UNDER CERCLA, INTERIM FINAL, OCTOBER 1988 (OSWER DIRECTIVE 9355,3-01). THESE NINE CRITERIA ARE:

- OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT
- COMPLIANCE WITH ARARS
- LONG-TERM EFFECTIVENESS AND PERMANENCE
- REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT
- SHORT-TERM EFFECTIVENESS
- IMPLEMENTABILITY
- COST
- STATE ACCEPTANCE
- COMMUNITY ACCEPTANCE

ECONOMIC CONSIDERATIONS IS ONE OF THE CRITERIA, HOWEVER, OTHER FACTORS ARE EVALUATED DURING THE DECISION-MAKING PROCESS.

THE SECOND PART OF THE COMMENT REGARDED THE ULTIMATE DISCHARGE OF THE TREATED EFFLUENT. IN THE EVENT THAT THE EFFLUENT IS DISCHARGED TO SURFACE WATER (E.G., MANGROVE PRESERVE OR SOUTHERN CANAL), THE QUALITY OF THE EFFLUENT WILL COMPLY WITH ALL FEDERAL AND STATE WATER QUALITY STANDARDS.

A WATER QUALITY ASSESSMENT WILL BE PERFORMED AS PART OF THE CONCEPTUAL DESIGN OF THE TREATMENT SYSTEM, SO THAT UNKNOWN CONTAMINANTS CAN BE BETTER DEFINED. IN ADDITION, A TREATABILITY TEST WILL BE PERFORMED, SO THAT THE EFFECTIVENESS OF THE SELECTED REMEDY CAN BE MORE ACCURATELY ASSESSED.

THE ISSUANCE OF THE ROD WILL BE FOLLOWED BY A NEGOTIATION PERIOD WITH THE PRP. THIS PERIOD WILL

LAST AT MOST 120 DAYS. FOLLOWING THE NEGOTIATIONS, THE HYDROLOGIC STUDY WILL BE CONDUCTED FOLLOWED BY THE INITIATION OF THE DESIGN PROCESS OF THE TREATMENT SYSTEMS.

6. A REPRESENTATIVE OF THE HIGHLAND VILLAGE RESIDENTS COMMITTEE CONTENDED THAT DATA COLLECTION FROM THE MANGROVE PRESERVE STUDY WAS CONDUCTED DURING DROUGHT CONDITIONS AND THUS MAY HAVE UNDER-ESTIMATED PLUME CONDITIONS. IN ADDITION, THE COMMENTER EXPRESSED A DESIRE THAT THE LEACHATE BE TESTED WITH APPROPRIATE METHODS.

EPA RESPONSE: EPA AGREES THAT DATA COLLECTION WAS AT A TIME OF DROUGHT CONDITIONS. FOR THIS REASON, THE VOLUME OF LEACHATE EMERGING IN THE MANGROVE PRESERVE WAS PROBABLY LESS COMPARED TO NORMAL HYDROPERIODS. AT THE TIME OF SURVEY, GROUND WATER ELEVATION AT WELL 6 WAS APPROXIMATELY ONE FOOT LESS COMPARED TO PREVIOUS ELEVATIONS REPORTED IN THE SITE RI. AN INCREASE IN THIS ELEVATION PROBABLY WOULD HAVE EFFECTED MORE MATERIAL IN THE LANDFILL AND RESULTED IN A GREATER VOLUME OF LEACHATE EMERGING IN THE MANGROVE PRESERVE. THIS WOULD LIKELY RESULT IN AN EXPANDED AREAL EXTENT OF THE LEACHATE PLUME. THE QUANTITY, CONCENTRATION, AND POSSIBLY THE COMPOSITION OF THE LEACHATE COULD VARY WITH DROUGHT AND WET CONDITIONS.

IN RESPONSE TO THE SECOND PART OF THE COMMENT, A WATER QUALITY STUDY WILL BE PERFORMED PRIOR TO BEGINNING CONCEPTUAL DESIGN OF THE TREATMENT SYSTEM. THIS STUDY WILL INVOLVE COLLECTING LEACHATE SAMPLES AND ANALYZING THEM WITH STANDARD, PROVEN LABORATORY TECHNIQUES.

7. A REPRESENTATIVE OF THE HIGHLAND VILLAGE RESIDENTS COMMITTEE EXPRESSED A CONCERN REGARDING THE DRILLING METHODS THAT WERE USED AT THE SITE DURING THE RI.

EPA RESPONSE: THIS COMMENT REFERS TO CONCERNS THAT THE AIRLIFT DRILLING TECHNIQUE USED MAY HAVE BIASED SUBSEQUENT SAMPLING RESULTS BY STRIPPING VOCs FROM GROUNDWATER IN THE VICINITY OF THE WELL. THE SAMPLING PROTOCOL FOR AIR-DRILLED WELLS TYPICALLY CALLS FOR SUFFICIENT PURGING TO REMOVE AERATED WATER BEFORE COLLECTING SAMPLES. IN THE BISCAYNE AQUIFER AT THE SITE, WAITING A FEW DAYS BEFORE SAMPLING WILL SERVE THE SAME PURPOSE. THE AERATED WATER WILL BE CARRIED AWAY FROM THE WELL BY THE NATURAL GROUNDWATER FLOW.

8. A PARTICIPANT AT THE PUBLIC MEETING REQUESTED INFORMATION ON CONSIDERATIONS USED IN RECOMMENDING RECOVERY WELLS FOR ALTERNATIVE 3.

EPA RESPONSE: WITHIN THE SCOPE OF THE EPA REMEDIAL ALTERNATIVES, THE PREVENTION OF LEACHATE SURFACING WITHIN THE MANGROVE PRESERVE IS THE PRIMARY OBJECTIVE OF THE RECOVERY SYSTEM. CAPTURE AND TREATMENT OF LEACHATE, AS AN OBJECTIVE WITHIN ITSELF, ARE OTHER CONSIDERATION. THE LOCATIONS OF THE RECOVERY WELLS WERE SELECTED TO EFFECTIVELY CREATE A HYDRAULIC BARRIER TO LEACHATE MIGRATION INTO THE PRESERVE, THUS MEETING THE PRIMARY OBJECTIVE. EFFICIENCY OF LEACHATE CAPTURE, INCLUDING BOTH QUANTITY OF CONTAMINANTS REMOVED AND COST OF RECOVERY TREATMENT AND DISPOSAL WERE CONSIDERED IN THE LOCATION AND DESIGN OF LEACHATE RECOVERY WELLS, BUT THESE ISSUES ARE SUBORDINANT TO THE PRIMARY OBJECTIVE. WELL LOCATIONS CONSIDERED WERE ALONG THE LANDWARD BOUNDARY OF THE MANGROVE PRESERVE, AND AT THE TOE OF THE LANDFILL SEVERAL HUNDRED FEET WEST OF THE PRESERVE BOUNDARY. EXTENDING THE LINE OF BARRIER WELLS TO THE SOUTH AND NORTH WAS ALSO CONSIDERED, AS A MEANS OF CAPTURING LEACHATE IN THESE AREAS. THE WELL CONFIGURATION SELECTED AS BEST MEETING THE PRIMARY OBJECTIVE OF THE ALTERNATIVE IS A LINE OF WELLS ALONG THE PRESERVE'S WESTERN BOUNDARY.

THE INITIAL WELL ARRAY AND PUMPING RATES WERE ESTABLISHED BY ESTIMATION. AN ANALYTICAL MODEL WAS USED TO SIMULATE AQUIFER WATER LEVELS FOR A RANGE OF WELL SPACINGS AND PUMPING RATES. THE WELL SYSTEM GIVING THE BEST RESULT IS THE BASIS OF THE CONCEPTUAL DESIGN PRESENTED IN ALTERNATIVE 3.

9. A PARTICIPANT AT THE PUBLIC MEETING EXPRESSED SOME CONFUSION REGARDING THE PERMEABILITY REGARDING THE BOTTOMS OF THE LAKES, AND THE IMPACT OF THIS PERMEABILITY ON THE MIGRATION OF

CONTAMINANTS.

EPA RESPONSE: THERE IS NO IMPERMEABLE LAYER IN THE LAKES. THIS COMMENT MAY REFLECT A MISUNDERSTANDING OF A STATEMENT IN AN EARLIER REPORT TO THE EFFECT THAT THE LAKES WERE EXCAVATED THROUGH THE LESS PERMEABLE MIDDLE LAYER OF THE BISCAYNE AQUIFER. THE MIDDLE LAYER IS LESS PERMEABLE ONLY IN COMPARISON WITH THE EXTREMELY PERMEABLE OVERLYING AND UNDERLYING LAYERS. OTHERWISE THE MIDDLE LAYER CAN BE CHARACTERIZED AS PERMEABLE.

REMEDIAL DESIGN/REMEDIAL ACTION CONCERNS

THIS SECTION ADDRESSES SPECIFICALLY PUBLIC CONCERNS RAISED DURING THE COMMENT PERIODS WHICH HAVE TO DO WITH REMEDIAL ACTION.

REMEDIAL INVESTIGATION AND REMEDIAL ACTION ALTERNATIVES

1. A REPRESENTATIVE OF THE MUNISPORT DUMP COALITION AND THE FRIENDS OF THE OLETA RIVER, EXPRESSED CONCERN ABOUT EFFECTS OF AIR EMISSIONS ASSOCIATED WITH AIR STRIPPING AND WANTED TO KNOW IF CHLORINE WOULD BE REQUIRED FOR AMMONIA REMOVAL.

EPA RESPONSE: AIR STRIPPING AND CHEMICAL OXIDATION WITH CHLORINE WERE TWO OF THE PHYSICAL/CHEMICAL TREATMENT OPTIONS PRESENTED IN THE DRAFT FEASIBILITY STUDY ADDENDUM. EPA CURRENTLY FAVORS AIR STRIPPING OVER CHEMICAL OXIDATION WITH CHLORINE FOR REMOVAL OF AMMONIA DUE TO THE POTENTIAL THREAT TO AQUATIC BIOTA ASSOCIATED WITH THE USE OF CHLORINE. ON THE BASIS OF EXPERIENCE FROM OTHER INSTALLATIONS, AMBIENT AMMONIA CONCENTRATIONS WOULD BE ORDERS OF MAGNITUDE BELOW LEVELS WHICH COULD REPRESENT A HEALTH THREAT. BENCH OR PILOT TESTING WILL BE CONDUCTED PRIOR TO THE FINAL SELECTION OF A TREATMENT ALTERNATIVE TO ASSESS RISK TO HUMAN HEALTH CAUSED BY AIRBORNE RELEASE OF AMMONIA.

2. A LOCAL RESIDENT AND MEMBER OF THE FRIENDS OF OLETA RIVER, ASKED IF AND HOW OFTEN THE TREATMENT SYSTEM WILL BE MONITORED TO ASSESS THE EFFICIENCY OF THE SYSTEM.

EPA RESPONSE: SEMIANNUAL TESTING, IN THE DRY AND WET SEASONS, HAS BEEN RECOMMENDED BY FDER. ANALYSIS WOULD INCLUDE METALS AND OTHER POTENTIAL CONTAMINANTS. AS DISCUSSED IN THE ROD, QUARTERLY TESTING DURING THE START OF THE REMEDIAL ACTION WILL ALSO BE REQUIRED. PARAMETERS WOULD INCLUDE AMMONIA, CHLORIDES, AND CONDUCTIVITY.

#TA

TABLE 1
CHEMICALS OF POTENTIAL CONCERN AT THE MUNISPORT PROPERTY

SOIL	SURFACE WATER	SEDIMENT	GROUNDWATER
INORGANIC CHEMICALS			
ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM
AMMONIA	AMMONIA	AMMONIA	AMMONIA
ARSENIC	ARSENIC	ARSENIC	ANTIMONY
CHROMIUM	BARIUM	CADMIUM	ARSENIC
CYANIDE	CALCIUM	CALCIUM	BARIUM
IRON	CHROMIUM	CHROMIUM	CALCIUM
MAGNESIUM	COPPER	COBALT	CHROMIUM
MERCURY	CYANIDE	COPPER	COBALT
POTASSIUM	IRON	IRON	COPPER
SODIUM	LEAD	LEAD	IRON
TIN	MAGNESIUM	MAGNESIUM	LEAD
	MANGANESE	MANGANESE	MAGNESIUM
	MERCURY	MERCURY	MANGANESE
	NICKEL	NICKEL	MERCURY
	POTASSIUM	POTASSIUM	NICKEL
	SILVER	SILVER	POTASSIUM
	SODIUM	SODIUM	SODIUM
	STRONTIUM	VANADIUM	STRONTIUM
	VANADIUM	ZINC	VANADIUM
	ZINC		ZINC

ORGANIC CHEMICALS

SOIL

ACETONE
BENZYL BUTYL PHTHALATE
BETA-BHC
CHLOROFORM
BIS (2-ETHYLHEXYL) PHTHALATE
PHTHALATE
CPAH
4-METHYLPHENOL
NCPAH
PENTACHLOROPHENOL
PCBS
TOLUENE

SURFACE WATER

ACETONE
CARBON DISULFIDE PHTHALATE
4,4'-DDE
PCBS
PHENOL

ORGANIC CHEMICALS

SEDIMENT

BENZENE
BENZOIC ACID
CARBON DISULFIDE
CHLOROFORM
4-METHYLPHENOL
NCPAH
PENTACHLOROPHENOL
PHENOL

GROUNDWATER

ACETONE
BENZENE
BENZYL BUTYL PHTHALATE
CARBON DISULFIDE
CHLOROBENZENE
CHLOROFORM
DELTA-BHC
BIS (2-ETHYLHEXYL) PHTHALATE
4-METHYLPHENOL
NCPAN
PENTACHLOROPHENOL
PHENOL
TOLUENE

SOURCE: CDM, 1988

TABLE 4
HEALTH EFFECTS CRITERIA FOR CHEMICALS IN THE SURFACE WATER,
SOIL AND FISH AT THE MUNISPORT PROPERTY

CHEMICAL	REFERENCE DOSE (RFD) (MG/KG/DAY) (A)	CANCER POTENCY FACTOR (B) (MG/KG/DAY) (-1)	WEIGHT OF EVIDENCE (C)
ORGANICS			
ACETONE	(D) 1.0 X (10-1)	--	D
BETA-BHC	--	1.84	C
BIS(2-ETHYLHEXYL)- PHTHALATE	2.0 X (10-2)	6.84 X (10-4)	B2
CARBON DISULFIDE	1.0 X (10-1)	--	D
CHLOROFORM	1.0 X (10-2)	8.1 X (10-2)	B2
4,4 -DDE (E)	5.0 X (10-4)	3.4 X (10-1)	B2
PAHS- (CARCINOGENIC) (F)	--	11.5	B2
PCBS	--	7.00	B2
PENTACHLOROPHENOL	3.0 X (10-2)	--	D
TOLUENE	(D) 3.0 X (10-1)	--	D
INORGANICS			
ARSENIC	--	1.5	A
BARIUM	5.7 X (10-2)	--	D
CHROMIUM (G)	5.0 X (10-3)	--	D
COPPER	4.0 X (10-2)	--	D
CYANIDE	2.9 X (10-2)	--	D
LEAD	(H) 6.0 X (10-4)	--	D
MANGANESE	(D) 2.2 X (10-1)	--	D
MERCURY	(I) 2.0 X (10-4)	--	D
NICKEL	(D) 1.0 X (10-2)	--	D
PHENOL	4.0 X (10-2)	--	D
SILVER	3.0 X (10-3)	--	D
TIN	(D) 6.4 X (10-1)	--	D
ZINC	(D) 2.1 X (10-1)	--	D
VANADIUM	2.0 X (10-2)	--	D

(A) EXCEPT WHERE NOTED. VERIFIED REFERENCE DOSE DEVELOPED BY EPA AND REPORTED IN INTEGRATED RISK INFORMATION SYSTEM (IRIS) (EPA 1987A).

(B) ORAL CANCER POTENCY FACTORS DEVELOPED BY EPA CARCINOGEN ASSESSMENT GROUP AND REPORTED IN IRIS (1987). VALUES IN BRACKETS ARE INHALATION POTENCY FACTORS.

(C) EPA CARCINOGENIC WEIGHT-OF-EVIDENCE CLASSIFICATION.

(D) RFD DERIVED FROM HEALTH EFFECTS ASSESSMENT FOR THIS CHEMICAL (EPA 1986A).

(E) VALUES PRESENTED ARE FOR DDT.

(F) VALUES PRESENTED ARE FOR BENZO(A) PYRENE. THESE VALUES ARE CURRENTLY SUSPENDED BY EPA PENDING REEVALUATION OF THE DATA. HOWEVER, THESE VALUES WILL BE USED IN THIS ASSESSMENT TO PROVIDE SOME ESTIMATE OF RISK.

(G) VALUES PRESENTED ARE FOR CHROMIUM (VI).

(H) RFD DERIVED FROM EPA OFFICE OF DRINKING WATER ANALYSIS IN SUPPORT OF THE MAXIMUM CONCENTRATION LEVEL GOAL (MCLG) (EPA 1985A).

(I) RFD DERIVED FROM EPA OFFICE OF DRINKING WATER ANALYSIS IN SUPPORT OF THE HEALTH ADVISORY (EPA 1987D).

(--) NO CRITERION DEVELOPED FOR THIS CHEMICAL AND THIS TYPE OF TOXICITY.

SOURCE: CDM, 1988

TABLE 5
COMPARISON OF SURFACE WATER CONCENTRATIONS WITH ARARS
MUNISPORT LANDFILL PROPERTY
(UG/LITER)

CHEMICAL	ARAR (A)	CONCENTRATION					
		ONSITE LAKES		OLETA RIVER AND TRIBUTARIES		SOUTH AND EAST AREA	
		MEAN	MAXIMUM	MEAN	MAXIMUM	MEAN	MAXIMUM
ALUMINUM	(B)1,500	ND	ND	169	410	LT 200	11,800
AMMONIA (UN-IONIZED)	(C)20	160	6.800	NA	NA	NA	NA
COPPER	(B)15	--	--	25	28	LT 25	56
	(C)30	16	50	--	--	--	--
CHROMIUM	1,000	ND	ND	LT 10	9.3	ND	ND
CYANIDE	5	LT 10	0.04	ND	ND	ND	ND
IRON	(B)300	--	--	ND	ND	120	3,100
	(C)1,000		125	1,300	--	--	--
LEAD	(C)30	ND	ND	NA	NA	NA	NA
MANGANESE	(D)100	9.3	30	LT 15	24	LT 15	42
NICKEL	100(100)D	ND	ND	ND	ND	LT 40	22
SILVER	(B)0.07	ND	ND	ND	ND	LT 10	70
ZINC	(C) 30	LT 2 X (10-2)	150	NA	NA	NA	NA

(A) UNLESS OTHERWISE NOTED. ARAR IS THE STATE OF FLORIDA CRITERION FOR THIS CHEMICAL (FLORIDA ADMINISTRATIVE CODE 17-3.051, 17.3.061, AND 17-3:121).

(B) IN PREDOMINANTLY MARINE WATERS.

(C) IN PREDOMINANTLY FRESH WATERS.

(D) AMBIENT WATER QUALITY CRITERION FOR INGESTION OF FISH AND SHELLFISH.

ND = NOT DETECTED OR NOT DETECTED AT CONCENTRATIONS ABOVE BACKGROUND.

NA = NOT APPROPRIATE; NO APPROPRIATE CRITERIA ARE AVAILABLE FOR COMPARISON OF CHEMICAL CONCENTRATIONS IN THESE SAMPLES.

SOURCE: CDM, 1988

TABLE 6
EVALUATION CRITERIA

- OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT - ADDRESSES WHETHER OR NOT A REMEDY PROVIDES ADEQUATE PROTECTION AND DESCRIBES HOW RISKS POSED THROUGH EACH PATHWAY ARE ELIMINATED, REDUCED, OR CONTROLLED THROUGH TREATMENT, ENGINEERING CONTROLS, OR INSTITUTIONAL CONTROLS.
- COMPLIANCE WITH ARARS - ADDRESSES WHETHER OR NOT A REMEDY WILL MEET ALL OF THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS OF OTHER FEDERAL AND STATE ENVIRONMENTAL STATUTES AND/OR PROVIDE GROUNDS FOR INVOKING A WAIVER.
- LONG-TERM EFFECTIVENESS AND PERMANENCE - REFERS TO THE MAGNITUDE OF RESIDUAL RISK AND THE ABILITY OF A REMEDY TO MAINTAIN RELIABLE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT OVER TIME ONCE CLEANUP GOALS HAVE BEEN MET.
- REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT - REFERS TO THE ANTICIPATED PERFORMANCE OF THE TREATMENT TECHNOLOGIES THAT MAY BE EMPLOYED IN A REMEDY.
- SHORT-TERM EFFECTIVENESS - REFERS TO HOW QUICKLY THE REMEDY ACHIEVES PROTECTION, AS WELL AS POTENTIAL ADVERSE IMPACTS ON HUMAN HEALTH AND THE ENVIRONMENT THAT MAY OCCUR DURING CONSTRUCTION AND IMPLEMENTATION OF THE REMEDY.
- IMPLEMENTABILITY - REFERS TO THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF A REMEDY, INCLUDING THE AVAILABILITY OF MATERIALS AND SERVICES NEEDED TO IMPLEMENT THE CHOSEN SOLUTION.
- COST - INCLUDES CAPITAL AND OPERATION AND MAINTENANCE COSTS.
- STATE ACCEPTANCE - INDICATES WHETHER, BASED ON ITS REVIEW OF THE RI/FS AND PROPOSED PLAN, THE STATE CONCURS WITH, OPPOSES, OR HAS NO COMMENT ON THE PREFERRED ALTERNATIVE.
- COMMUNITY ACCEPTANCE - ASSESSED IN THE RECORD OF DECISION FOLLOWING A REVIEW OF THE PUBLIC COMMENTS RECEIVED ON THE RI/FS REPORT AND THE PROPOSED PLAN.

SOURCE: 40 CFR 300.430(E)(9) (1990) AND 55 FR 8849

TABLE 7
SELECTED REMEDY PRELIMINARY COST ANALYSIS
MUNISPORT LANDFILL PROPERTY

LEACHATE COLLECTION WESTERN RECOVERY WELL ARRAY

CONSTRUCTION COST	\$535,000
ANNUAL O&M COSTS	65,000

ONSITE TREATMENT IN STRIPPING POND

CONSTRUCTION COST	\$1,425,000
ANNUAL O&M COSTS	255,000

ENHANCED FLUSHING NORTH OF LANDFILL 2,000 LF

CONSTRUCTION COST	\$745,000
ANNUAL O&M COSTS	75,000

MONITORING

CONSTRUCTION COST	\$190,000
ANNUAL O&M COSTS	35,000

TOTAL CONSTRUCTION COST	\$2,895,000
TOTAL ANNUAL O&M COSTS	\$430,000

TOTAL 15-YEAR PRESENT WORTH

(INCLUDING O&M)	\$6,166,000
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